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Looking Forward To The '80s

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FEBRUARY 1980



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FUTURE

LIFE

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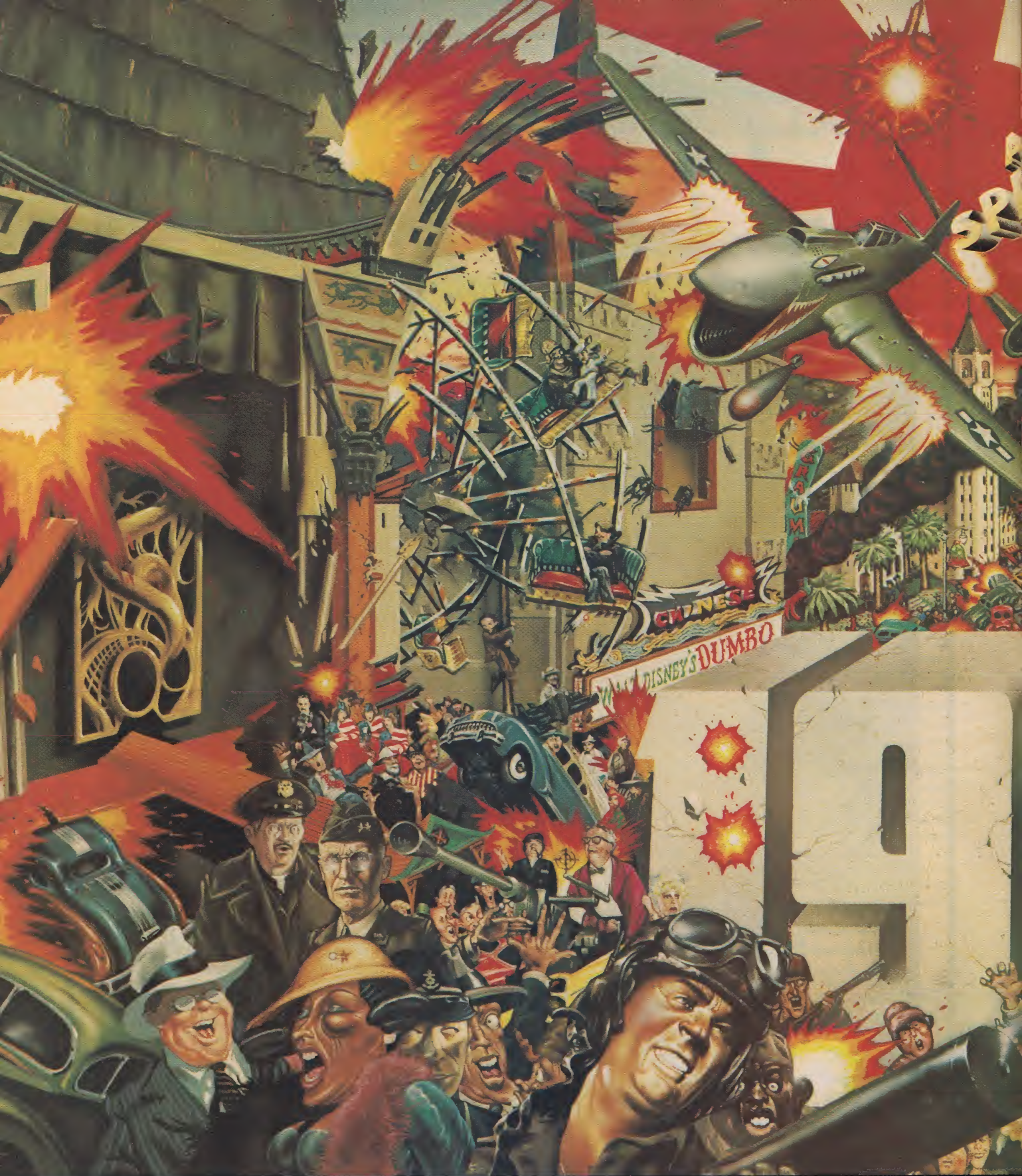
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STARLOG PRESS is the exclusive publisher of the official 1941 magazine and posterbook. The 1941 magazine is chock full of color photos of all the stars and revealing special-effects scenes. Including penetrating interviews with the key production people and leading stars, the 1941 magazine takes you behind the scenes and lets you know how this amazing project was put together. Imagine full-color photos of special-effects sequences depicting: houses exploding and falling into the ocean, a disconnected ferris wheel rolling down the street, a tank collision into a paint store causing a multi-colored disaster, planes crashing into the California tar pits, plus much more. Also included is the movie's storyline and complete credit and cast information. The 1941 magazine is 100 pages big, with 64 pages of full-color.

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ON THE COVER: The U.S.S. Enterprise finally takes off on its spectacular motion picture adventure. For the history of its troubled journey back into space, see the story on page 18.

ON THE CONTENTS PAGE: This "Quasi-Stellar Object" by Jon Lomborg symbolizes the cosmos we all create in our minds. For more cosmic art, see Portfolio on page 58.

output

What the World Needs Now . . .

Arthur Clarke once explained that, calendar years working the way they do, the celebration of our 2000th year *should* begin on New Year's Day, 2001. He also admitted to a personal prejudice in favor of the 2001 date (I can't imagine why), but said that he was quite certain that the celebration the world is bound to stage for that occasion will undoubtedly begin on New Year's Day, 2000.

"The irresistible vision," he said, "of those three big zeros appearing on calendars will probably be overwhelming, and I shall fall under the spell the same as everyone else."

In the same way, we are now celebrating the beginning of the 1980s, having in fact completed only 1979 calendar years on this planet. No matter—here we are, and we too have fallen under the spell of the appearance of a bold new number that will be with us for the next ten years. The number 8.

The arrival of a new decade tends to have a birthday quality to it. Not a birthday of a culture or a religion or a nation—but a birthday of the human race. And the occasion begs us to reflect on the last ten and look forward to the next ten—to take stock and evaluate our progress as a living species.

By and large, the 1970s saw social upheaval nosed out by more workaday problems. True, women's rights and gay rights blossomed in the 70s, but those advances were overshadowed by the appearance of the energy crisis, inflation, world conflicts and treaties.

The *negatives* of the 1970s seem to stand out in memory since, unfortunately, we did not have a major human triumph like the landing on the Moon to bring the entire world to its feet cheering.

That's what we needed this last decade—a wonderful event of some kind that would intellectually and emotionally reaffirm the glory of the human race. Yes, we need those moments in our *individual* lives, and we need them just as profoundly on a planetary scale. We need them to inspire us onward and upward—for without them, the problems wear us down and erode our lust for life.

What we need most of all in the 1980s is a major human triumph.

What *might* it be? What *should* it be?

A cure for cancer is predicted by 1985 (see FUTURE LIFE #8, Output). We can walk on the surface of Mars in 1988 (see FUTURE LIFE #14). Every issue, the pages of this magazine are filled with ideas and predictions—some full-fledged plans, some just seeds—some small breakthroughs, some cosmic in scale—but all of them goals and accomplishments that are desirable for an improved future life.

We produce this magazine not just to entertain and enlighten our readers, but also to provide some food for thought—some directions worth considering—and some inspirational visions to help bridge the dry spells between the actual positive events in the world.

And who knows, somewhere there may exist a scientist in some field, weary from long nights of frustrating work, who will pass a newsstand, see our magazine, take it home with him, and find the next morning he awakes with new energy and determination—having been fueled by what he read as he was falling asleep.

I would like to think that we are contributing in our own way toward several human triumphs of the '80s—events of such intellectual and emotional importance that they will bring the entire world to its feet, laughing and weeping and cheering.

What the world needs in the '80s is not just love.

Kerry O'Quinn/Publisher

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input

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REDS TO MARS?

... Congratulations on your fine article "Mars in '88" (FUTURE LIFE #14).

It was well researched and well written. I am placing it in my file for future reference. Hope it will stimulate additional U.S. action in a future planning area that I am sure is not being ignored by the U.S.S.R.

Craig Covault
Aviation Week & Space Technology
Washington, DC

NEEDED: VISION

... Alas, you are preaching to the converted. We could land on Mars in '88 and we could have peace on Earth if we all lived up to the wisdom of whatever moral code our various cultures cherish.

The fault lies not in our technology, but in our vision.

Nevertheless, I will maintain my exercise routine in hope of a press seat on the shuttle.

Robert C. Cowen
The Christian Science Monitor
Boston, MA

MARS TRIP

... I was impressed with your article, "Mars in '88." It's such a shame that this country hasn't had a consistent manned space program since Jack Schmidt last landed on the Moon. In 1961 President John F. Kennedy made a commitment to landing a man on the Moon before 1970. *We did it.* It's amazing what this country can do with a strong commitment and sufficient funds. I believe that it is possible for us to reach Mars by 1990. All we need is a commitment by a President who knows what's best for the future of this country as well as the Earth. So I say to you, my fellow Americans, write to your congressman and emphasize how much you are concerned about our future in space.

John Morgan
Boulder, CO

MALaise CURE: MARS

... Let me personally echo the sentiments expressed by Mr. O'Quinn in FUTURE LIFE #14. I find it becoming more and more apparent as time goes on that, since the Apollo landing of 1969 when the people of the United States felt such a tremendous feeling of pride and accomplishment in having put a man on the Moon, there has followed a decade of psychological depression. This was brought about by a number of factors — the drama of the Vietnam war, Watergate, the Arab boycott, etc.

The year 1969 was a time when people everywhere gazed up into the night skies in wonder and awe at the true magnitude and beauty of the universe. But we have all come crashing back to Earth like Icarus, back to the harsh and often disheartening realities of our lives.

Indeed, in this time of recessions, shortages and so on, we need to be uplifted psychologically and spiritually.

We need to take another moment of time away

from our problems and turn our attention back to the skies.

For the sake of the creative soul of man ...

Let's go to Mars!

Sheldon Young
L'Orignal, Ont., Canada

COMPUTER BACKLASH

... Re: "The Whole World in Your Hand" (FUTURE LIFE #13).

Rats! Fifty kilometers from nowhere (Idaho) and the Mercedes runs out of alcohol! The console-mounted terminal reached the AAA by satellite bounce and let me know of a Mobile station two or three kilometers down the road — just before it spat at me, a cute manufacturer's joke to let me know there was too much sunspot interference.

Well, there the little pump stand was, old man, shack and all, an archaic CB antenna piercing the annoyingly clear sky. I drove up, asked for car-Vodka and brought the TI 9950 pocketbox to the ready when, to my utter surprise, the attendant/owner/manager stuck his wrinkled paw in through the window and said, "We don't use them fancy COM-puter things out hyar. Twenty-six and a quarter."

Here it was, the good land, where a man was a man, a woman was a woman, and cash still ruled their world. And how satisfying it was to me to retire from the terminal-world home had become and to slip back to the times when no one looked at you strangely if a fancily engraved tender note passed under one's nose as payment. I handed over the dollars and the quarter, then drove away — period! No buttons to press, no automatic accountant to justify to, no terminal socket to plug into! The psychological gratification of it all, buying something, paying at once and just going away — forever! Why, if I had chosen not to log it into the pocketbox, maybe nobody would have ever known!

What wonderful concept! It might even replace the computer accountant mode!

I Abro Cini
Brooklyn, NY

ART OBSESSION

... Most of the centerfolds in FUTURE LIFE are very colorful and inspiring, and I would like to see every one of them on my wall. But I don't take them out of the magazine because it ruins the next article. I'm the kind of guy who likes to have things complete. The back of the left side of the centerspread features information on the artist and his painting, so couldn't you do something similar on the back of the right side — like show another of his paintings or display more information? This way the centerspread is complete and doesn't interfere with any other article when it is taken out.

Jerry De Luca
Montreal, Que., Canada

CORRECTION

In the Input section of FUTURE LIFE #14, we answered a letter by Dana L. Cadman by giving our permission to print any FUTURE LIFE articles which might help convince people that the space program is crucial to our future. This statement was not completely correct. Because of copyright laws, we cannot give general permission to reprint everything that appears in FUTURE LIFE; however, if those interested will write for permission to use specific articles, we will grant that permission if at all possible.

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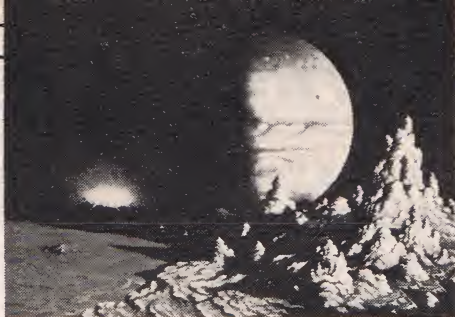
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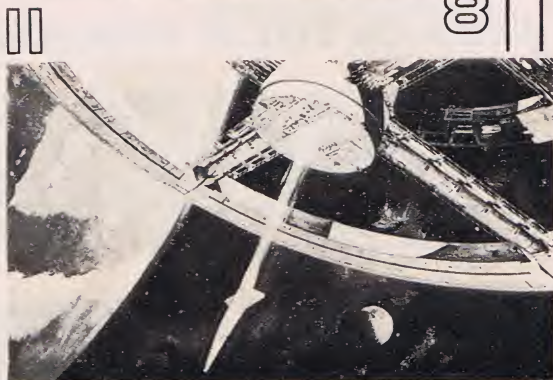
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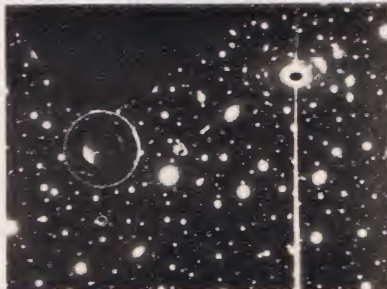
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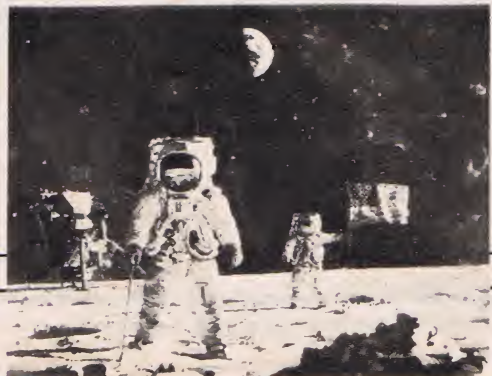
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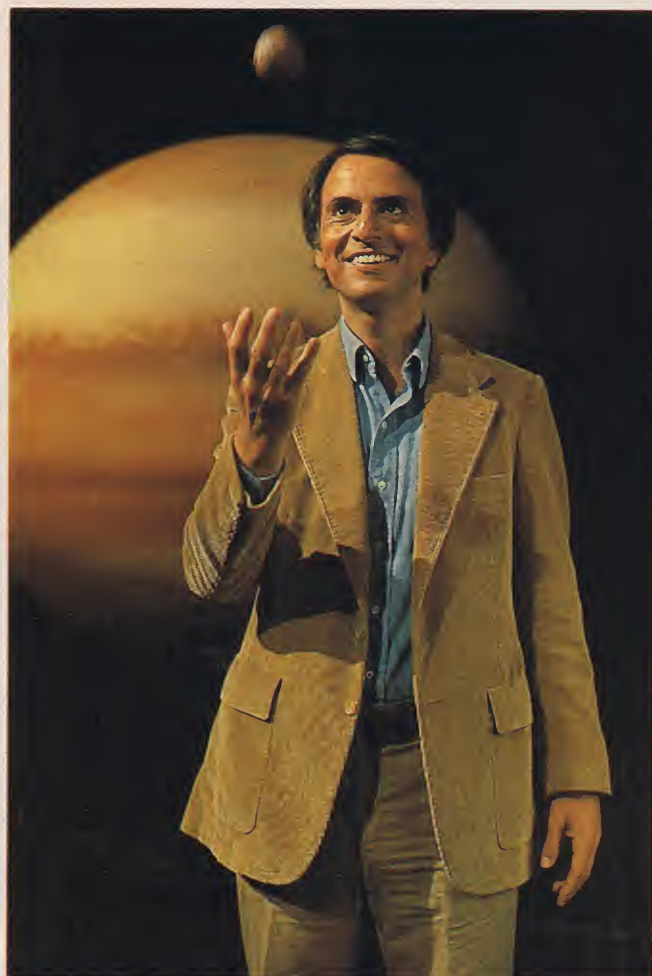
When scientist/author Carl Sagan appears in his PBS series *Cosmos* late in 1980, he will take viewers into regions never before explored by modern man. He will, for instance, take a leisurely stroll through a human brain. He will also glide along the Cosmic Calendar, a netherworld which will offer the 15 billion years of universal history since the Big Bang at arm's length. He'll visit Saturn's rings, the ancient library of Alexandria (destroyed over 1,200 years ago) and a black hole deep in space.

All the above-mentioned visual miracles will be handled by the creative crew at Magicam, a special effects outfit headquartered at Paramount Pictures in California. Hired by the producers of *Cosmos* to perform the impossible, the folks at Magicam gleefully met the challenge of taking Professor Sagan places where no man has gone before.

In one sequence, for instance, they had to somehow get the noted author into the corridors of the long destroyed Alexandrian library in a segment of the show clearly important to Sagan because "the destruction of that Library, which may have postponed the Renaissance by a thousand years, is a lesson for us on the importance and fragility of knowledge."

Magicam went to work. Basically, what the magicians at Magicam do is combine two different images into one seemingly impossible scene. In order to get Sagan into the hallowed halls of the library of Alexandria, they had to construct an elaborate miniature version of the historic edifice's interior. When the shot was ready to roll, Sagan was placed against a large blue screen, nowhere near the miniature set.

Two different cameras began recording the proceedings; one



Jupiter pays Carl Sagan a visit during a cosmic juggling act.

camera filming the miniature set close-up in order to give it a mammoth appearance, the other shooting Sagan from a distance, in order to make him minuscule in size. Then, using a common video technique called Chroma-Key, the blue was dropped out from behind Sagan and his solitary image electronically combined with the towering halls of the great library. The finished image was recorded and, presto, instant time travel for TV.

Cary Melcher, vice president of production at Magicam, states modestly that Magicam is the effects outfit to perform this sort of visual trick. "This is state-of-the-art-television," he says. "Our matting (the joining of two distinct images), with the fine detail of shadows that tie the character down onto the background, is far superior to what anyone else is doing. Everyone in TV can do blue-screen Chroma-Key, but we do it here every day for a living.

The other important factor, of course, is the Magicam system.

"Say you want to take a small object out of limbo and make it look 20 feet high. Well, you can do that anywhere, with stationary locked-down cameras. The secret with Magicam is that you pan and tilt the dolly back as the actor walks out next to this object. It adds a reality to the scene. When people around the world see *Cosmos* and the Alexandria library with Carl walking around in it, I think 90 percent of them will think the library still exists, or that it was some huge set. The last thing that will strike them—the last thing—is that it was a miniature set."

The magic concocted by Magicam is sure to prove astounding to TV audiences. It has certainly proven itself just that to the show's producers. Adrian (The Ascent of Man) Mallon, *Cosmos*' science advisor and co-producer, marvels, "Usually, you expect the reality will fall short of the dreams you had for the show. In this case, Magicam has improved on the dream. This is not just a facilities house. They have a deeper intellectual grasp of the subject matter."

Yet another magical aspect of the special effects system is its flexibility in terms of budget. Allotted only \$500,000 for special effects (spanning all forms of space and time), *Cosmos* would have run into deep financial problems had it not been for the miniature-laden Magicam unit. "We couldn't have even thought about building a set for the Alexandria library," Mallon states, "let alone the other scenes, for less than \$2 million."

With the show still in production and Magicam still working doggedly on effects, all concerned parties are totally enthusiastic about what the finished series will look like this fall. Sagan, a hard man to please, is one of the most vocal fans of the special effects, promising that the phantasmagoric science show will take viewers "on a walk through this vast expanse of time, during which matter has evolved into beings with consciousness, able to understand the *Cosmos*."

—Ed Naha

PHOTO © 1979 EDUARDO CASTANEDA

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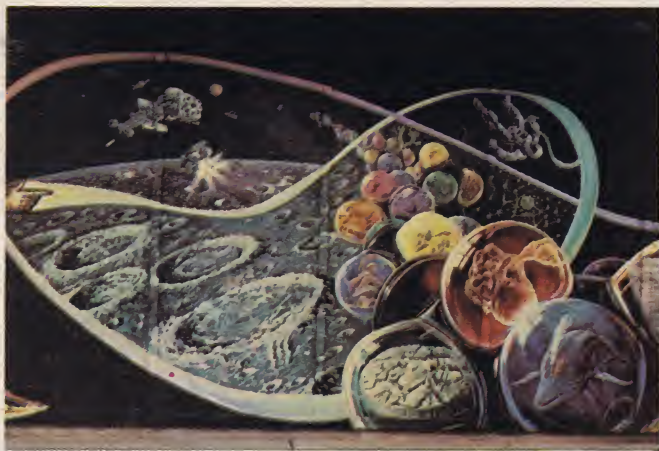
COSMIC VISTAS

SIDEWALK SPACE ART

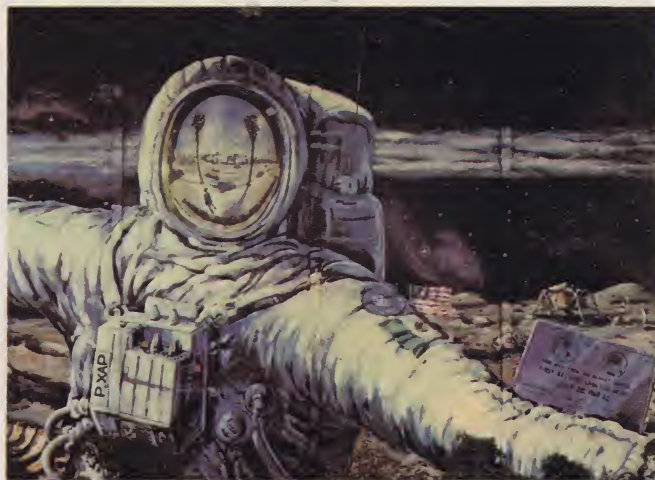
Passersby on Washington Boulevard in Culver City, Calif. may be startled to suddenly find themselves staring at a somewhat weird space-scape rather than the usual California scenery. The outer space artistry is part of a new mural which has recently been executed on the four exterior walls of the city's Department of

Motor Vehicles, and it is replete with symbols and scenes of our past, present and future.

The artists, who call themselves "Los Dos Streetscapers," are particularly suited for this type of work. Wayne Alaniz Healy, when he is not painting outdoor murals, is an engineer for the Hughes Aircraft Corporation; David Botello is an illustrator by vocation and a science fiction fan by inclination. So when they won a contract to decorate the black-



"Cruising Through Space and Time" offers DNA oriented abstractions.



The comic reflection featured in "On The Tail of the Comet" mural.

walled building, it soon became the canvas for an interpretive history of the space program. "I included a lot of things I wanted to say for a long time," states Healy. "A lot of people come down on technology, but there's a lot of beauty in it."

The work is actually made up of four separate murals. The first, "On the Tail of the Comet," features a Moonscape on which stands an astronaut in whose helmet the bemused

viewer can see a painted "reflection" of the street. The space traveler holds a sensor device in one outstretched hand, and in the other a long-tailed comet. ("I call it 'Healy's Comet,'" grins Wayne.)

The second, "Cruising Through Space and Time," is more abstract in theme; the most overpowering image is that of a huge DNA molecule that seems to soar away from the street in-

(continued on page 15)



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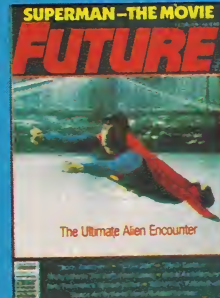
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(continued from page 13)

to space. Each of the molecule's spheres encloses such representatives of Terran life as a hump-backed whale, a fetus and a kid on a skateboard. Also present is a larger-than-life Albert Einstein, bicycling cheerfully along a time/space continuum.

The third wall, "On Ramp to Energy Expedience," is the artists' statement about the current energy crisis, featuring a domed Moon-city against which Earth rises with the OPEC nations in full view. It also includes the portrait of a nude man caressing a bottle which contains a V8 engine, spewing pollution into the sky. "We're faced with an energy crisis," explains Healy, "but he won't let go of that bottle."

The final wall, and the last to be completed, is titled "Space Program U.S.A.—L.A. Reentry." Against a view of Los Angeles at night, a burning Skylab streaks across the sky. "It's



Artists Wayne Healy and David Botello pose next to their portrait of a cheerfully bicycling Einstein.

a statement about our space program," Healy says of this last image. "Skylab could have been fitted with retro

rockets or any number of things that could have kept that giant space laboratory from falling. To me, to

anyone involved in aerospace, there's no reason that ever should have happened." —Barbara Krasnoff

SCIENCE FICTION EVENT

ENGLAND HOSTS SF WORLDCON

It's not just lemmings who make for the sea. Late last August, over 3,500 science fiction fans swarmed into Brighton, the elegant Regency resort on England's south coast.

They were headed for the five-day 37th World Science Fiction Convention, this year known as Seacon.

Major attractions at the fourth world SF convention to be held in Britain were the two guests of honor, American Fritz Leiber and British Brian Aldiss.

The convention's big event was the presentation of the Hugo Awards, the SF equivalent of the Oscars. Winners included *Dreamsnake* by Vonda McIntyre (best novel); *The Persistence of Vision* by John Varley (novella); "Hunter's

Moon" by Poul Anderson (novel-ette); and "Cassandra" by C.J. Cherryh (short story). Stephen Donaldson's *Chronicles of Thomas Covenant The Unbeliever* won him the award for best new writer. Anne McCaffrey's *The White Dragon* took the Gandalf Book-Length Fantasy Award, and Ursula Le Guin was voted the Gandalf Grand Master (named after a Tolkien character).

Actor Christopher Reeve flew in to collect the "best film" award for *Superman*, which beat the English favorite, the BBC's *Hitch-Hiker's Guide to the Galaxy*.

And, not least, Gollancz the publishers held a reception in the onion-domed Royal Pavilion, a favorite holiday resort of three 19th century British monarchs. There's some doubt that the SF mob lived up to Queen Victoria's code of etiquette, but no one's filed a complaint yet.

—Pat Glossop

MEDICAL MARVEL

HEP HIPS

According to the old song, the thigh bone's connected to the hip bone. But, in the near future, the hip bone may be connected to miniature gauges and transmitters and tied in to a computer. At least, that'll be the case for artificial hip joints, as bioengineers try to discover why a significant percentage of the 150,000 annual hip joint replacements suffer mechanical failure.

The strain gauges and transmitters that will make this possible are a direct outgrowth of the space program and were originally designed to detect various mechanical strains to which a rocket is subjected in flight.

The devices are currently under development by the Jet Propulsion Laboratory and the orthopedic surgery division of the University of California at Los Angeles.

The instrumented prosthesis will be implanted in volunteers requiring the operation. The various loads that the joint receives will be transmitted out of the patient's body to a nearby receiver which will feed it into a decoding system.

Until the realization that such devices were applicable, there was no way to measure, as they occurred, the stresses applied to the joints. So, although researchers knew that hip joint designs were inadequate, they had no way of determining why.

—Philip L. Harrison

TUNES FOR TOMORROW

FUTURE DREAMS

"I'm not clinging to my yesterdays," claims rock singer/composer Nick Gilder on his newest LP, *Frequency*. His statement comes in the middle of a song entitled "Into the 80s" which the rock-and-roller states is his declaration about the sounds of things to come. "I'm not futuristic in my instrumentation," he says, "but my attitude is definitely future tense. I think that, in the next few years, the world will see a very futuristic attitude creeping into every form of contemporary music—rock, disco, what have you. It won't just concern itself with instrumentation, but lyrical content and attitude as well."

Gilder, who hit the top ten last year with the single "Hot Child In The City," has toyed with futuristic thought on past albums, with songs such as "21st Century" and "Fly High," but *Frequency* is, in his own estimation, "the furthest I've gone yet." With compositions such as "Worlds Collide," "Watcher of the Night," "Metro Jets" and "Time After Time," he attempts to meld contemporary pop sounds with slightly jarring lyricism.

"The futuristic slant of my songs is subtle," he states. "I try to place the song in a different time period so, on one level, it sounds very contemporary and very here. Yet, if you listen to it in its totality, it's also very there. The feeling I'm trying to convey is something like that projected by a band some 100 years in the future trying to emulate the rock and roll sounds of the 20th century."

"The imagery in my songs is con-

fusing because the narrator is confused. I think that confusion will be the prevailing attitude of the everyday citizen in the near future. He will be in awe of the world around him. He won't be able to understand how we can have so very much around us and yet do so very little with it."

Adding to the strangeness of the narratives on Gilder's highly accessible LP are their equally strange origins. "I don't know exactly what prompted the thoughts which led to these songs," Gilder admits, "but a lot of them arose from dreams I was having. I'm a little reluctant to talk about this because, well, it does seem like a pretty strange occurrence. In general, I don't think that people can tell you exactly where their songs come from but a lot of the more futuristic images in this album originated as scenes in dreams. They were so vivid that, when I woke up, I remembered them perfectly and attempted to recreate them verbally."

Although Gilder admits that, musically, *Frequency* does not pioneer a dramatically different pop sound, he feels that it does establish an attitude that may, one day, play an important role in futuristic rock. "In the next few decades," he says, "the persona of a rock performer will change. People are going to see that the popular entertainer reflects an ever-changing element in our society. Rock is a valid reflection of the thoughts of the young; sexually, politically, etc. What I'm trying to do is establish that pattern. The original title of this album was *On Your Frequency*. It's about communication. In the future, more and more people will realize that communication is really what rock is all about."

—Ed Naha

LEGAL AIRS

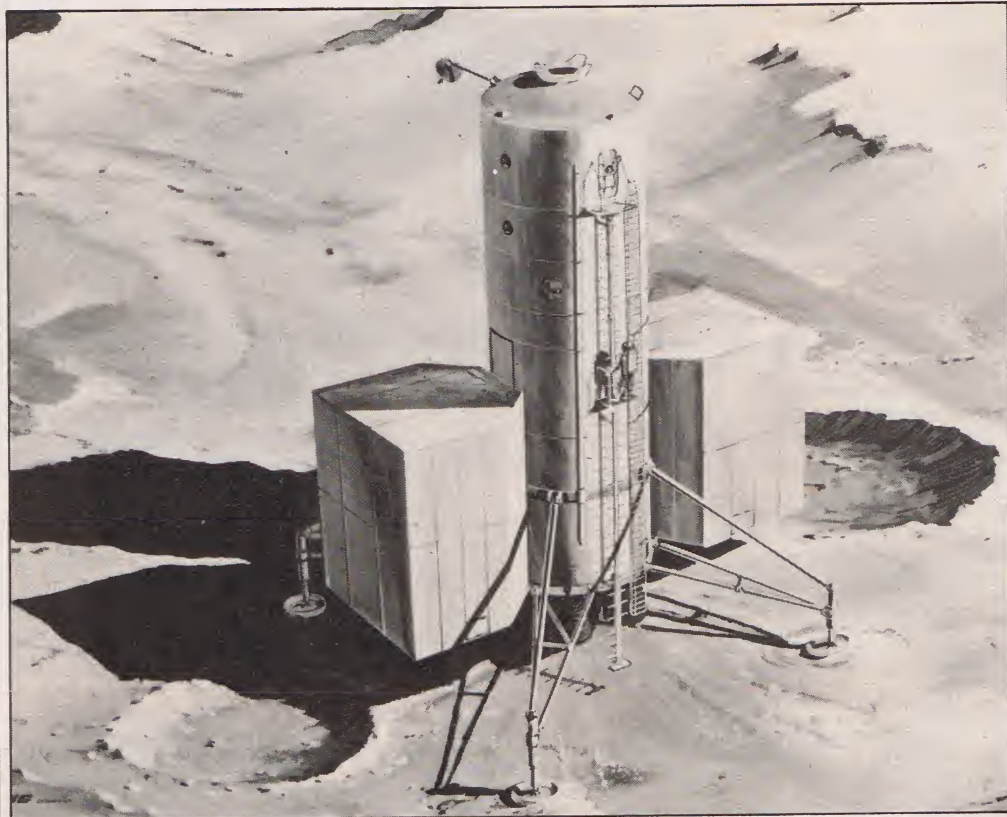
UN DEBATES THE USEFUL PIECES OF OUTER SPACE

Space exploration is rapidly passing the point of science for the sake of science—or national prestige. Nations and private industry alike are eyeing the natural resources to be found on the Moon and in the asteroids. Proponents of space industrialization make a convincing argument for solving Earth's energy and material shortages by exploiting the abundant resources of the solar system.

In an attempt to promote international cooperation and fair distribution of extraterrestrial wealth, the United Nations Committee on Peaceful Uses of Outer Space has developed a draft treaty (UN Doc. A/34/20) that would govern the use of the Moon and other celestial bodies. Presented to the UN General Assembly last September, the so-called Moon Treaty has generated a flurry of controversy.

Although conceived in the spirit of international cooperation and equity, many proponents of commercial space ventures fear that the controls proposed by the Moon Treaty will bring the end of private industry in space... before it has a chance to get started.

Critics of the UN treaty claim that it would cause a virtual moratorium on the commercial exploitation of space. That's because the current Moon Treaty calls for yet another treaty to be established at a time in the near future when such exploitation "is about to become feasible." The catch to that provision, according to



Will the UN Treaty cause a moratorium on using the resources of the Moon for the benefit of Earthlings?

Moon Treaty critic Leigh S. Ratiner, is that it would put a damper on private interests which are considering investments in space enterprises—already high-risk propositions. In his statement to the U.S. House of Representatives, Ratiner pointed out how the Moon Treaty would make potential space exploitation even less attractive to already cautious entrepreneurs. "In an area that requires new technology and

highly speculative predictions about future markets, it is impossible for a public corporation to also take the risk that, at the end of a 15- or 20-year period of such significant capital spending for research and development, it will be politically impossible to enter the commercial recovery phase of their activity."

Supporters of the Moon Treaty contend that there are significant advantages to furthering our knowledge of the possibilities of exploitation before negotiating the final treaty. They also claim that the treaty currently under consideration would not necessarily result in a moratorium, citing confidence in the United States' ability to successfully negotiate favorable conditions before the eventual regulatory body is established by the UN.

The feasibility of such an outer space regulatory body is itself under fire. Says critic Ratiner, "One marvels at the arrogance of those who would even feel qualified to subject such vastness beyond our understanding to an elaborate legal regime governing future generations' needs and growth patterns."

On the other hand, treaty supporters maintain that such a governing body is essential to protect the environment of space from disruption and adverse effects.

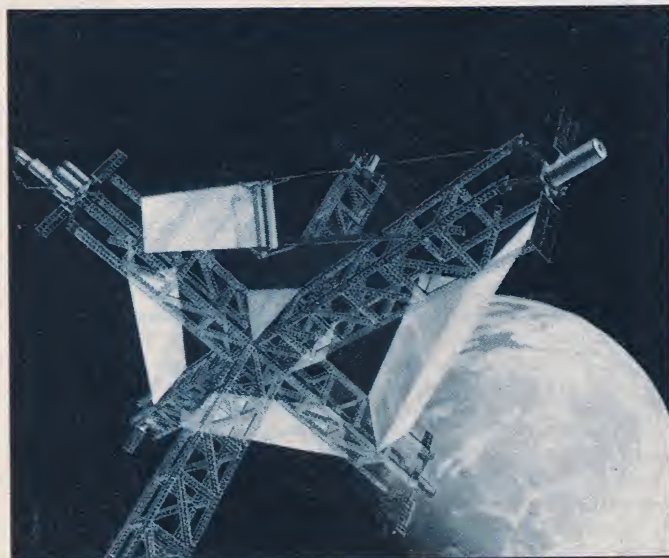
A large part of the Moon Treaty

controversy stems from disagreement over the interpretation of some vaguely worded passages. Statements such as the one which declares space to be the "common heritage of all mankind" may be interpreted as implying simple goodwill, or as literally establishing that the Moon and asteroids are the common property of all Earth's inhabitants. (Similar wording in laws which pertain to the resources of the seabed have led to lengthy international procrastination: Countries which have the technology to recover seabed resources have effectively been put on hold by countries which don't have the required technology, but claim the right to protect their share of the resources which are "the common heritage of all mankind.")

Critics of the UN Moon Treaty voice concern that a hasty allotment of power today might mean unhealthy restrictions on the future of space commerce; supporters claim that the treaty is necessary to insure the equitable sharing of space resources among all the peoples of Earth.

Before the treaty is ratified in the UN, the U.S. Senate must vote for ratification—which it may do as early as January 1980. If you have an opinion on the UN Moon Treaty, express your views to your senator soon.

—Jennifer L. Atkins



Construction of solar power satellites will be affected by UN Treaty

ANTI-GRAVITY

FIRST SPACE COLONISTS TO DEPART IN 1981

Under the auspices of RCA in Camden, New Jersey, several thousand space colonists will be selected for a 1981 launch aboard a NASA shuttle.

Yes, you're reading right...but don't start heading for New Jersey, suitcase in hand. RCA is talking about lofting colonies of those little varmints so well known on July 4th picnic outings—ants!

Orbit '81 is an educational project sponsored by RCA as part of the NASA Getaway Special program, which allows private individuals to fly experiments onboard the space shuttle. RCA is working with inner-city high school students from Camden High School and Woodrow Wilson High School in New Jersey on devel-

oping the ant colony scheme, to be flown as early as 1981. The students' initial plans call for a three-part space colony that would contain as many as several thousand ants. Placed in a five-cubic-foot capsule, the ants would be divided into special compartments that, with the aid of a fly-wheel motion, simulate degrees of Earth's gravity, while one section would house ants in complete weightlessness.

Using a microcomputer, monitoring instruments and cameras, the full life cycle, including births and D.I.O. (deaths in orbit), will be observed during an expected seven-day flight in space. Among the variables to be analyzed are the amount of oxygen, water and food consumed by the ants, their average weight, the incubation time for baby ants, and the percentage of deaths.

Selection of ants as test subjects appeared feasible for several reasons. With their hard exoskeletons, ants can survive the g-forces during launch



ART: HOWARD CRUSE

and re-entry. As home builders, the insects have proven themselves capable of living in small places, using the cilia on their feet (small hairlike growth) to clasp rough surfaces, preventing them from floating around in a space environment.

The RCA-sponsored program will involve all types of disciplines, from program management to biology, electronics, optics and chemistry. Principal technical advisor on the project is Dr. John Torka, a biophysicist in the Engineering Department at Temple University, Philadelphia.

According to RCA, the project is considered timely by NASA officials who feel it may contribute to a number of scientific studies and laboratory programs now underway to establish the feasibility of manned colonies in space.

A feverish competition is expected to ensue as companies vie for contracts to supply ant colonists with needed space helmets and flight suits.

—Leonard David

MAROONED

MEMO FROM MARS: SEND MONEY

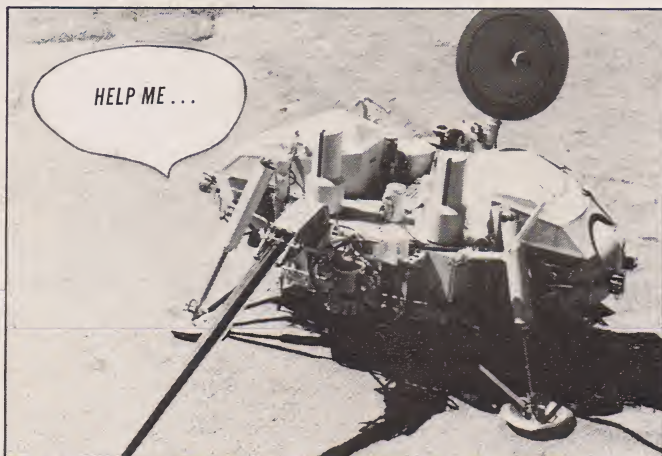


PHOTO: NASA

Mockup of the Viking lander: will it fall silent when funds run out?

Help! That's the word from two Viking landers sitting on the planet Mars since 1976. When funds are no longer available, the data link between Earth and the mechanical robots may fall silent.

But now you can contribute to a special "Viking Fund," designed to keep the Vikings functioning, transmitting valuable information about Martian weather, "Marsquakes," and clear surface photographs, perhaps into the 1980s and beyond.

"Private funding of Viking will be a graphic demonstration to Washington officialdom of the immense public interest that exists in the space program," states Stan Kent, chairman of the fund. The do-it-yourself space program is operated by the San

Francisco Section of the American Astronautical Society (AAS).

Approximately \$1 million is the financial target, with donations used to receive, process and analyze Viking data over the next seven years. All contributors will receive acknowledgement of their gift, as well as an open invitation to the presentation of the fund to NASA. The presentation will occur in Washington, D.C., on or before July 20, 1980: the fourth anniversary of its landing on Mars.

So break away from that "Martian malaise," mail your tax deductible contributions (minimum amount \$1.00; made payable to the Viking Fund) to: The Viking Fund, P.O. Box 7205, Menlo Park, California 94025.

—Leonard David

PHONY FRIVOLITY

SIMULATED FUN

The very latest in amusement park attractions will not be a real attraction at all, but a simulated adventure. Designed by Doron Precision Systems of Binghamton, N.Y., a leading manufacturer of driver training simulators, 12-passenger "adventure capsules" utilizing wide-screen movies, sound effects, and sophisticated electronics will be playing games with your mind in the very near future.

Riders have no sense of horizon once inside the darkened capsule, currently dubbed "SR-2." Movies that take peripheral vision into account, plus a moderate amount of actual pitching from side to side and front to back, enable the mind to create its own reality, giving passengers sensa-

tions that they would actually get on most amusement attractions.

In addition, the SR-2 will enable people to go places and do things never before possible in an amusement park. For example, a current ride in development is a roller coaster, which is pretty standard amusement park fare. But how about a ride in a submarine, trips in a crop duster or hang glider, or aircraft carrier landings? Future plans also call for a trip into outer space.

The main advantage of the simulators is that they are a safe and inexpensive thrill. A modern roller coaster, for example, can cost upwards of a million dollars or more...not including liability insurance. An SR-2 equipped with a roller coaster sequence costs around \$35,000 to produce, and the chance of someone getting hurt is rather unlikely.

Unless it's a simulated accident.

—Philip L. Harrison

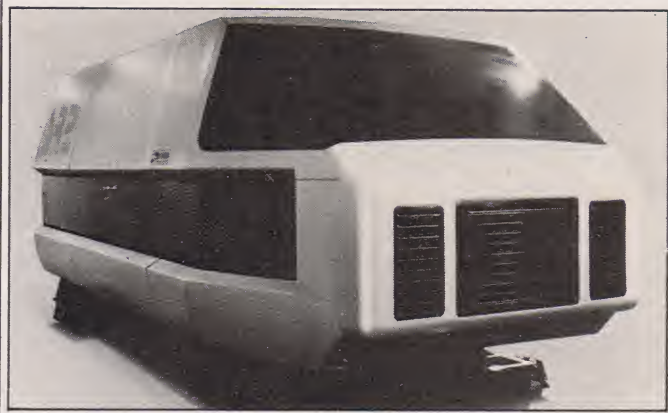


PHOTO: COURTESY DORON PRECISION SYSTEMS

SR-2: Simulated fun in a 12-passenger adventure capsule.

The Producer, The Director and The Stars Discuss:

STAR TREK

THE MOTION PICTURE

A Phenomenon Comes of Age

By ED NAHA

In December of 1976, Gene Roddenberry sat in his offices on the Paramount lot in Hollywood surrounded by Star Trek paraphernalia. Work on his long awaited *Star Trek* film had ground to a halt. One script had just been tossed out. A director had just been signed who had not one printed word to work from. Two screenwriters with no knowledge of science fiction were waiting in the wings for a shot at the movie. Leonard Nimoy was refusing to take part in the project. "Well," Roddenberry sighed good naturedly, "no one ever said that this was going to be easy."

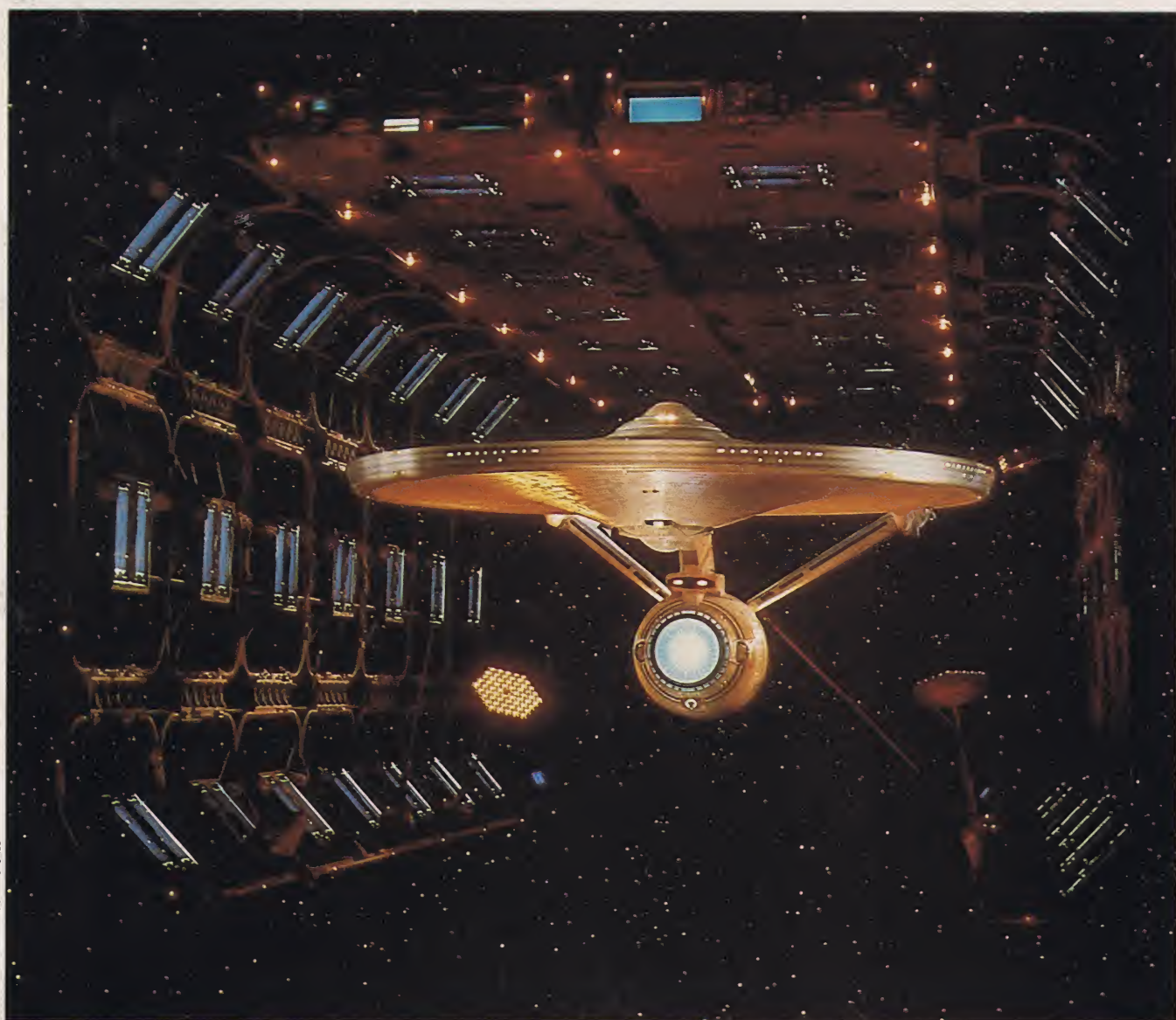
Three years later, Roddenberry's dream and, indeed, the dream of millions around the world, is finally making it to the big screen. The time of *Star Trek—The Motion Picture* is at hand. The release of the *Star Trek* film, however, marks more than just the return of a dozen or so popular characters to celluloid; it begins a whole new chapter of what is, undoubtedly, the most remarkable cultural phenomenon ever to arise in America from the entertainment field. *Star Trek—The Motion Picture* is more than a mere movie; it is the culmination of an almost religious mania that has stood fast throughout the country for nearly a decade.

The release of the film also brings to a close a tale of epic woe that, in terms of blood, sweat and tears, rivals the most dire of Greek

dramas. The struggle to re-launch the *Enterprise* is an involved saga that can be traced back nearly two decades when a then-youthful producer, Gene Roddenberry, saw a chance to move into television in a big way.

A veteran TV writer (*Dragnet*, *Have Gun Will Travel*) then embroiled in an ambitious dramatic series, *The Lieutenant*, Roddenberry had an idea for a science fiction show that would not be a kiddie-oriented affair. "I wanted to turn out a science fiction show about real people," he recalls. "I also wanted to make a statement about the human condition."

Inspired by his all-time favorite fictitious character, Captain Horatio Hornblower, he fashioned a story taking place in the distant future, concerning the exploits of a starship Captain and his loyal crew. In 1963, NBC gave him the go-ahead for a low-budgeted pilot and *Star Trek* was born. NBC did not pick up the pilot film, however ("Too cerebral," Roddenberry chuckles), and ordered a second, revised show. "The network requested a lot of changes," Roddenberry remembers. "They were upset over the fact that the *Enterprise* had a crew that was 50 percent men and 50 percent women. They were afraid viewers would think that there was *messing around* going on in space. We had to fiddle with the male-female ratio. Oh yes, they *really* demanded another change. They told



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Top of page: The crew of the new *Enterprise*. Above: *The Enterprise* slowly makes her way out of dry dock.



Above: Spock's shuttle takes *The Enterprise* by surprise as he rejoins his mates.



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Top of page, right: The commander of the Klingons (Mark Lenard) meets his maker via V'ger. Above and right: *The Enterprise* crew within V'ger, a set which posed real danger.

me definitely: *The guy with the big ears has to go!*"

A second pilot film, which saw William Shatner replace original star Jeff Hunter in the captain role, was filmed. The network liked the streamlined show and, in 1966, *Star Trek* went on the air. Roddenberry was excited about the show's possibilities from the outset. "I felt that I could say what I wanted to say and get away with it in science fiction. The genre was the only place one could escape the censor in terms of religious and political taboos. I didn't think anyone would catch on at the network. And," he adds with a laugh, "most of the time, no one did."

The show was a qualified success. Debuting during an era when teenagers, long associated with heavy TV viewing, were becoming involved in what would eventually take root as the counter-culture movement, the show didn't have great ratings: solid, but not overwhelming. In those days before ratings demographics were calculated, the

show was placed mid-ground on the popularity polls although, percentage-wise, it had the highest amount of young viewers of all the prime-time shows.

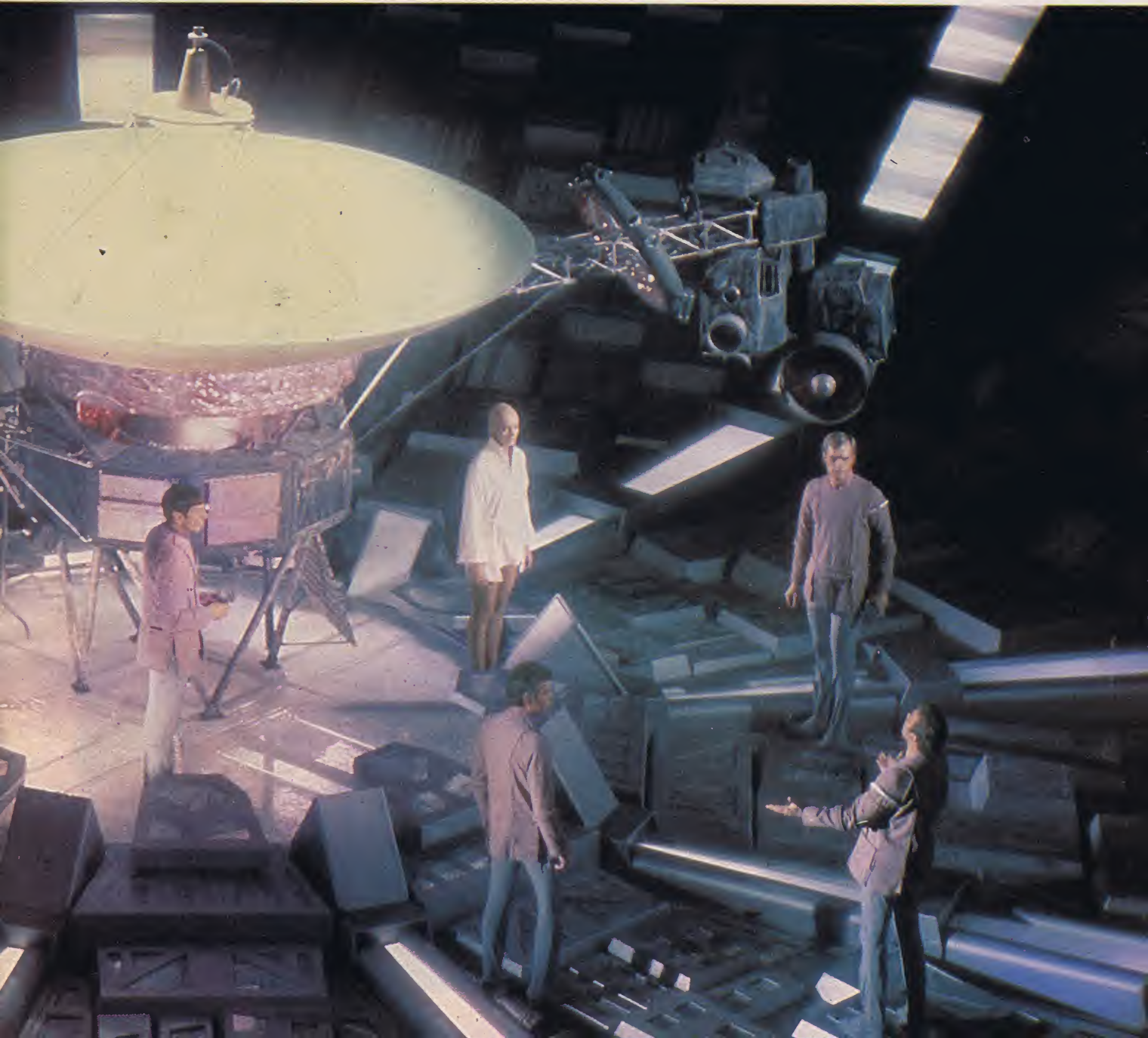
Star Trek limped through two seasons, with Roddenberry struggling to maintain both the quality and the inventiveness of the scripts. Top flight science fiction writers were called into the holy war. But the network, never realizing the potential of the show, did its best to scuttle the good ship *Enterprise*, changing its scheduled time period from season to season and, at times, what seemed to be month to month. By the third season, Roddenberry was out as line producer and a complete novice was brought in to guide the show into oblivion. *Star Trek* was cancelled in 1969. It was considered dead by NBC. Had they only known.

* * *

In 1970, Paramount Pictures decided to syndicate the old *Star Trek* series to local stations throughout the country. Stations were

slow to pick up the show at first. Within two years, however, the Paramount front office was sensing a growing trend within the country. *Star Trek* was being watched by more people in syndication than it had been when a network item. A *Trek* boom was in the making, with some stations showing the series seven days a week. Conventions devoted to the show were drawing hundreds of thousands of fans (dubbed "Trekkies") throughout the country. Dollar signs dancing in their heads, the Paramount executives quickly began licensing *Trek* products like mad.

By 1975, *Trek* mania was widespread. Books, toys and blueprints had deluged the market. That Christmas, the *Star Trek Star Fleet Technical Manual* shot to the top of the *New York Times* best-seller list, knocking *Joy of Sex* out of number one position. If all this action was happening because of the old show, Paramount executives reasoned, imagine the amount of dollars that could be





Above: *The Enterprise* hits warp drive in the beginning of her cat and mouse game with the alien presence known only as V'ger. The special effects for the *Star Trek* film ran into snags which caused a mass firing at Paramount. Doug Trumbull entered at the 11th hour and his crew manufactured effects 24 hours a day for months.

Right: Spock takes his post as science officer aboard *The Enterprise* after joining his fellow crew persons mid-flight. The equipment on the bridge was specially designed to include real computers this time out, making it extra difficult for the actors involved to master their duties.



PHOTOS © 1979 PARAMOUNT PICTURES

generated from an *all new* version of *Trek*. And thusly was Gene Roddenberry given an office at Paramount Pictures once again.

* * *

The rigors involved in the re-making of *Star Trek* would have sent a lesser man into a laughing academy within a matter of months. Stalwart creator Roddenberry, however, chose to look at the ever evolving angst quite philosophically, even in the darkest of hours. "I'm not bitter that it's taken so long for Paramount to understand the importance of the film," he stated in the midst of chaos. "Look how long it took the Bank of America to realize the value of computerized checking."

In May of 1975, Paramount reinstated Roddenberry as producer of what was initially planned as a TV film. Roddenberry, pushing for a bigger budget, actually conned the company into springing for a theatrical release. That's when the fun began.

"I handed them a script and they turned it down," he recalls. "It was too controversial. It talked about concepts like 'Who is God?' The movie then sagged for quite some time. It really got bogged down. I didn't hear anything for over three months. Meanwhile, unknown to me, the executives then in charge were interviewing writers, accepting outlines. I found out about all this quite by accident. None of the outlines were accepted. I think the main reason for all the problems with those scripts rested in the fact that most of the people making the decisions concerning the film knew little or nothing about *Star Trek*. As it turned out later on, several of the principals had never even seen the show."

Then, in 1976, Paramount's new president, Michael Eisner, went to see *Star Wars*. "I was delighted with the picture, but I felt a gigantic frustration that *Star Trek* was not up there on the screen." The movie project, at that point, got a well-intentioned in-house push. Phil Kaufman, who would later bring *Invasion of the Body Snatchers* to the screen, was signed to direct. Two British screenwriters, Chris Bryant and Allan Scott, were asked to come up with a script. Chris and Allan, good natured chaps responsible for *Don't Look Now* and *The Girl From Petrovka*, didn't know the difference between a sun spot and a sunburn but they were eager to learn.

At this point, the non-existent film's technical advisor, NASA staffer Jesco von Puttkamer, was on stand-by alert. "In the last three and a half years," he says, "I've gone through all the machinations of a technical advisor. I went through the screen treatments page by page and provided written analyses of how scientifically feasible they were. Finally, I started working on the script that Allan and Chris came up with for the original movie. I had to play go-between for Gene and the two writers.

"Allan and Chris would call me at all hours asking questions. You know, 'What is a black hole?' 'If we discover some sort of extraterrestrial message that sends the world into a cataclysmic state, what would the contents of that message have to be?' That sort of stuff. I

worked on the script with them for a year or more. Then, both the script and the movie were rejected by Paramount."

Hedging their bet slightly, Paramount decided to begin a fourth, independent television network. *Star Trek*, they reasoned, would be the perfect foundation upon which to build. Tossing out the script, the script writers and director Kaufman, they planned a two-hour *Trek* telefilm and subsequent TV movie specials dealing with the future voyages of the *Enterprise*. Roddenberry was astounded. With no film, he had no stars. The entire crew had to be re-signed for television purposes... and that proved a problem, especially in the Vulcan area.

"They were going to do a moderately budgeted movie with Phil Kaufman," says Leonard Nimoy, recalling those days of confusion. "And I said I'd do that movie, but then it was cancelled. Then, they wanted to anchor a new fourth network with *Star Trek* and they asked me to do the two-hour pilot movie and appear on five of the other 20 shows. I couldn't see doing a part-time Mr. Spock, and so I said no. Then there came the usual gossip stories about my being thought I was trapped by the role, I'd had a breakdown, etc. ... all a lot of fantasy."

While Nimoy grappled with his fantasies,

DeForest Kelley: "At times it was like filming in a combat zone. Things were always blowing up."

Roddenberry confronted his harsh realities. William Shatner was available for the show on a part-time basis only and, so, the creator of the show had to come up, very quickly, with a new chain of command for the series. New characters, Decker and a Vulcan youth called Xon, were hastily concocted.

Puttkamer picks up the thread. "They bought something like 12 scripts for the show and, then, *Star Wars* took off like a rocket. Paramount went back to the original idea of making a motion picture."

* * * * *

After meeting with pop science fiction writer Allan Dean Foster, Gene Roddenberry came up with a concept for the proposed film that would allow for both action adventure and philosophical clout. The final script, by Roddenberry and Harold Livingston, sends an unknown alien being/vessel zooming on a collision course with Earth. Enroute the thing destroys every object in its path. The refurbished *Enterprise* is sent into action, reuniting the old *Star Trek* crew (at this point, still Spock-less) plus new additions Decker (Stephen Collins) and Ilia (Persis Khambatta). Not only must the *Enterprise* crew stop the alien creature, they must find out *what* and *why* it is.

Robert Wise was signed to direct. Shatner

agreed to recreate Kirk and, a rumored 48 hours before the press conference was called to announce the movie, Leonard Nimoy rejoined his comrades of the future (thus initiating another hasty script re-write). Paramount also signed Bob Abel to helm special effects. Abel, best known for his flying Levi jeans commercials, was handed a few million dollars and told to go to it.

Shooting began late in 1978. At that time, no one knew exactly what problems would arise between the first day of production and completion (and there would be plenty). The prevailing attitude on the set was one of terminal nervousness. Recounts Nichelle Nichols (Lt. Uhura): "The fear that you can't go home again was subliminal in everybody's minds. We weren't sure if we could recapture that magic. And if we could for the public, could we for ourselves?"

"We were also in awe of working with this legendary, Academy Award-winning director, Robert Wise. Waiting in wardrobe that first day, surrounded by the old crew and the old cast, was just indescribable. We all went to our stations on the bridge. The lights were bright and glaring. We all simply stopped in our tracks. I turned away to keep from being embarrassed. I didn't want anyone to see the tears in my eyes. I turned my head and caught someone else doing the same thing. I looked around and all of us were standing there with tears in our eyes. Spock. The Captain. We all felt silly and we all felt in love.

"Bob Wise looked up and said 'What's this? Is this the crew of the *Enterprise* that I've been fearing?' I couldn't believe it. The great legend that we've been in awe of working with is scared of *us*? 'We're scared to death of *you*!' I said. He smiled. 'I'm just one little, gentle man. I'm a pussycat.' Well, we all started laughing and crying at the same time. So, we all got excused and went back into makeup to have our faces re-done. The makeup people were furious. It took us another hour to get ready."

Director Wise was admittedly nervous about his plum assignment. "I told the cast when I met them," he explains, "I know how it feels to be an alien in the world. I am the alien of this crew. But it worked out just fine. They were a marvelous group and it all came together very quickly."

"This was my first film venture into outer space. My other science fiction films were earthbound. So, for me, this was a totally new experience. The special effects innovations that have come along since my last science fiction film are amazing. Computers are tied to camera movements allowing you to program entire shots, both live action and miniatures. Modern technology is now very strongly felt in the making of a science fiction film. I never felt dwarfed by the technology, but we always had to be conscious of it.

"One of the things we had to remember was not to regard *Trek* as a special effects film. Although we will have marvelous effects in the movie, the strong points of this film are the feelings and personalities of the characters themselves. They are in the foreground. They are the vital part. The special effects are important, but not the

most important aspect."

As it turned out, both aspects of the film gave the director and his cast headaches. "We had some very difficult spots along the way, script-wise," states DeForest Kelley, best known as the dour Dr. McCoy. "Our main objective was to make this movie *Star Trek*; to have the characters react realistically, familiarly to each other in a series of extraordinary circumstances. At certain points, the characters just didn't mesh together properly. That instigated a certain amount of rewrites."

"Constant changes were made in the script," Wise admits. "Not any major changes but many, many minor ones. Dialogue. Transitions. Always for the sake of improvement."

The rewrites made it hard for everyone involved, but no one more so than Indian beauty Persis Khambatta. "I have a slight problem," she confides with a grin. "In school in India, where I learned how to speak English, I had trouble with the difference between the sound of a 'V' and that of a 'W.' Of course, I had a lot of lines in the script with 'Vs' and 'Ws' in them. The rewrites made me very nervous. I would just be getting used to

pronouncing 'Warp 7' and all these other terms and I'd be handed something entirely different. . . words that I'd never seen before in my life. We all had a good laugh when I tried to get through those lines on short notice!"

Even discounting script problems, the re-making of *Star Trek* would have proven to be a taxing experience anyway, simply because of its subject matter. "The sets were amazingly complicated," says Stephen (Decker) Collins. "But Bob Wise was great in terms of keeping things smooth and keeping us sane. The latter part was not always so easy to do. There was one scene that had to be shown in which we're awaiting an impending disaster aboard the ship. It eventually involves a lot of special effects. It required 48 camera set-ups. So, you had cameras placed in 48 different positions to catch all the different angles and reactions. Each of the 48 set-ups were shot in four different ways with four different cameras. Two for the regular film and two for the special effects footage. So, for every fraction of that scene, for every close-up, you'd have maybe 15 takes. Usually, when you get the right take, you hear the director yell 'Cut.' In this scene, you'd go through eight or ten

takes four different times. It was horrible. I would have rather gone to the dentist than shoot that scene. We were so happy to finish that one scene we almost threw a wrap party. The whole sequence lasts about two minutes on the screen and it took us two weeks to shoot!"

"Then, in another climactic scene, a bright light had to be flashed into everyone's eyes. There comes a time when you're hanging there with a spacesuit on and a flashlight hitting you in the face when you think to yourself, 'Is this any way for a grown man to make a living?'"

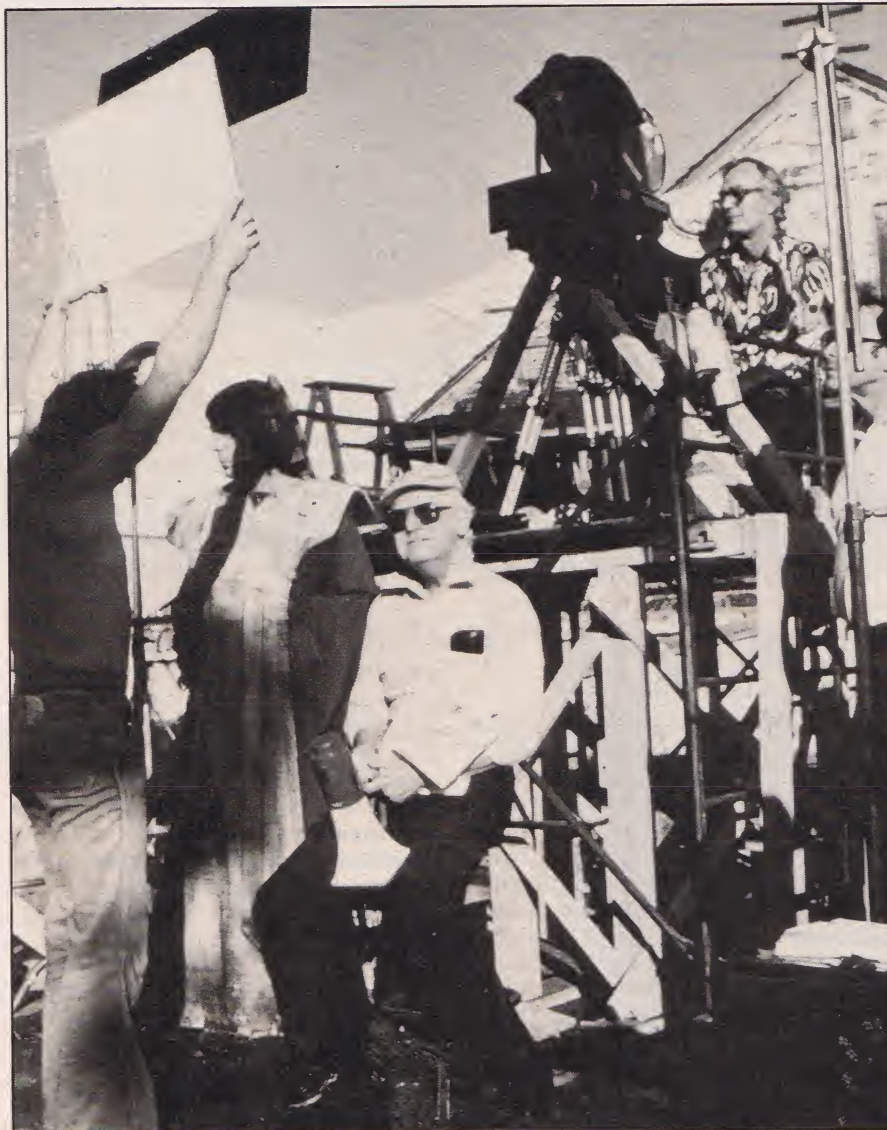
Aside from the normal rigors of shooting, there were constant problems regarding the electronic aspects of the sets. "Things were always blowing up," DeForest Kelley laughs. "At times, it was like filming in a combat zone. During the ending sequence of the film, all hell broke loose. We were in this monstrous set, actually inside the alien ship. It was an electronic monster. So much depended on the lighting and the electronics, we thought we'd never get out of there. As soon as a scene would start to go smoothly, something would happen. People were falling through sections of the set, crashing into plastic glass-like stuff. We had daily injuries. There were constant small explosions. Bill Shatner stepped on a part of the set that wasn't supposed to be stepped on and he fell right through. Things got so dire that they had an actual scoreboard on the set listing all the actors, crewmembers, propmen and technicians. The ones that got injured got an 'X' for the day. My god, it seemed like we shot that scene forever."

The finale of the film proved a traumatic affair for actress Khambatta as well. "Stephen and I were surrounded by bright lights constructed by the effects people," she says. "And I tried to make the scene very real, very terrifying. I tried to keep my eyes open during the entire scene. The lights they were using were too powerful, though. I went home that night after finishing the scene and, at two o'clock in the morning, I woke up screaming, clutching my eyes. I couldn't see a thing. I thought I had gone blind. There was nothing I could do. I was crying and screaming. The next morning, the studio sent me to a team of specialists at UCLA. They patched my eyes and told me I shouldn't take off the bandages for a couple of days. The outer layer of my eyes had been burned off." The actress shrugs, adding philosophically, "If I ever have to play a blind person in a film, now I'll know exactly what the feeling is like."

Keeping things "up" in the morale department was a job that everyone assumed, although clearly it was Shatner who headed the on-set cheerleading squad. "Shatner is a great wit," beams Robert Wise. "During one climactic scene, when everything was falling apart, he broke into a monologue that had us on the floor."

"I became the fondest of Bill Shatner," agrees Collins, "in that, if there was a screw-up on the set, he'd always keep talking with that Kirkian efficiency. He would say 'Mr. Sulu, I think the camera man

(continued on page 66)



Director Robert Wise takes a breather between takes on the planet Vulcan exterior set.

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Homesteading the Solar System

Around the turn of the century people will begin homesteading space. Not applying for jobs to become cogs in some giant corporation or government behemoth, but actually homesteading.

Princeton professor Freeman Dyson points out that second-hand equipment and salvaged junk from government and corporate space efforts will open the door to cheap, family-scale asteroid homesteading. (For details on asteroid homesteading, read Dyson's *Disturbing the Universe*, Harper and Row, 1979.)

How will you go about homesteading? About 20 or 30 years from now, you and about two dozen friends will throw together a camper which will carry a wide angle, lightweight, Schmidt-style telescope with a computer system for tracking asteroids and other spacecraft (radar is only good for close range stuff). A reflection spectra analyzer will tell you what any object in the sights is made of and whether there's dirt and gravel on the surface or just bare boulders or if it's the hull of another spacecraft—all from millions of miles away. Say you're looking to set up a farm. You'll capture two small asteroid fragments—200 meters or less in diameter—one nickel/iron and the other carbonaceous chondrite. You'll slice up the nickel/iron chunk with a laser and feed it into a rented vapor deposition rig which will boil the metal with a huge solar collector and deposit it on a kilometer-wide balloon. In a few weeks you'll have a giant metal shell in which you'll install airlocks and windows.

That chunk of nickel/iron came from the core of a small planet which has been smashed to smithereens over the nearly five billion years it has orbited the asteroid belt. But your chunk of carbonaceous chondrite is a recent visitor, having orbited Sol for no more than a few million years. It broke off a captured comet. It no longer boasts a tail of boiling hydrogen, ammonia, methane and water. But inside it's still wet—at least 10 percent water—and full of ammonia. You distill out 500,000 tons of water, burn much of the ammonia to liberate nitrogen, electrolyze some of the water for oxygen, and grind up the dirt and gravel left behind for soil. You save some ammonia for fertilizer.

You now have dirt about six feet deep all over the inside of your one kilometer diameter Sweetvalley Farm and enough water to irrigate the whole works. You can strap on wings at the zero gravity region around the axis—rotation makes artificial gravity to hold things down below—and fly about in Sweetvalley Farm's Earthlike oxygen/nitrogen atmosphere.



You have, however, one waste byproduct left over from processing that carbonaceous chondrite. Those asteroids are named after the carbon of which they're full. It's mostly in the form of black, gunky, smelly oil, which won't be good for much except making plastic in the space era of solar and fusion power. You'll burn some of it to put carbon dioxide in the air (plants need it) and sell the rest cheap to the local synthetics company.

The final step is to start planting. Over a square kilometer of virgin soil (no weeds, no disease) waits for you and your friends. With your ability to control daylength, rainfall, temperature and even carbon dioxide content you'll have crops coming within weeks, at productivities 20 to 60 times higher than Earthside field crops. Mangoes and bananas grow like weeds. Cattle gorge on belly high alfalfa. Catfish leap in the ponds. Sweetvalley Farm feeds 10,000 people. A steady traffic of space tugs hauls produce to workers at the nearby asteroid mines which sell cobalt, nickel, chromium, platinum and gold to Earth.

Sound too good to be true? It may be. Soviet diplomat V.S. Vereshchetin has worried about this scenario for 20 years. He calls asteroid homesteaders "pirates." Loyal to the concept of an all-powerful central government, he is appalled by the prospect of just anyone running off to live however they please amid the riches of the solar system.

Maybe you're not afraid of a sour-puss Soviet diplomat who's terrified that somewhere, somehow, someone will have fun and get rich without a government permit. I'm not afraid, either. But right now us future space renegades have a problem.

On July 3, 1979 the U.N. Outer Space Committee reported out the "Agreement governing the activities of States on the Moon and other celestial bodies." And it's Vereshchetin's dream come true.

How would this treaty affect Sweetvalley

Farm? One day a shipload of troops will try to dock with you. The commander hails you over the com link. "I understand you appropriated asteroids NB876521 and CS539208 in the course of the construction of Sweetvalley Farm."

"Um, yeah," you reply.

"I also understand you performed this act under the flag of nonsignatory nation Pingo Pango in order to evade the humanitarian provisions of the 1979 Moon and Celestial Bodies Treaty."

"Whadaya mean, 'evade'? And don't sneer when you say Pingo Pango! I suggest you go home to the Achkstan Plateau or wherever you hail from and soak your head."

"The People's Liberation Army of Pingo Pango has just expelled the decadent oppressors of their nation and has signed the Agreement governing the activities of States on the Moon and other celestial bodies. Under Article XI Section 3, which states that 'neither the surface or the subsurface... or any part thereof... (of a celestial body)... shall become the property of any... non-governmental organization or of any natural person,' I hereby serve you an eviction notice."

"Just you try to make your phony eviction stick!"

"Pingo Pango has just received permission from the Space Authority, which is vested with control over all celestial bodies, orbits around them and trajectories to them by the 1979 Moon and Celestial Bodies Treaty, to relocate 15,000 Pingo Pango dissidents on Sweetvalley Farm."

"We'll thumb our nose at you from the comet belt."

"I'm sorry, but your relocation papers forbid your following any trajectory except home to Pingo Pango."

"Fred, are the asteroid collision defense beams working? Mary, got the troop ship lined up in your sights?"

The best way to escape this scenario is for at least one major world power, too big to be taken over by foreign troops and stable enough to keep its promises, to refuse to sign Vereshchetin's treaty. If you believe with me that our nation should become the guardian of the rights of space pioneers, write your Senators c/o U.S. Senate, Washington, DC 20510 or call their staffers at (202) 224-3121 (ask the operator to switch you to their offices). Tell your Senators to vote against the United Nations "Agreement governing the activities of States on the Moon and other celestial bodies." All we need is 34 Senators on our side to defeat Vereshchetin's scheme. Reach for the stars!



The Futuristic Philosophy of **THEODORE STURGEON:** "Ask the Next Question!"

The acknowledged master of the science fiction short story shares his thoughts on the pursuit of futuristic life, love and happiness.

By BJO TRIMBLE

Theodore Sturgeon is an acknowledged master of science fiction. He has influenced a countless number of contemporary writers, both in and out of the SF genre. His writing is well known for its fullsome characterization and its total understanding of emotion—human and alien. His novel, *More Than Human*, has been translated into 12 languages and has been optioned for a possible movie as many times. A master of the science fiction short story, he is well known in science fiction video circles as the author of two of *Star Trek*'s finest episodes, "Shore Leave" and "Amok Time." He is currently sharing his talent and insights through lecture and teaching tours, developing students in terms of expanding their imaginations and cultivating their writing skills. Recently, he found the time to sit down with *FUTURE LIFE* and discuss his feelings about the social structures of the future.

FUTURE LIFE: How do you, as a writer, see the future of love and human relationships?

STURGEON: Well, it depends on what span of future you're talking about. The trend, however, is to be more understanding of love. More and more you see investigations in fiction—and this is happening to the "old hands" as well as beginning writers—of very deep and close relationships between people of the same sex which are *not* homosexual. It always astonishes me that people have an unwillingness to understand this peculiar kind of closeness, as it touches a very deep chord in them. In the Korean War, for instance, there was a photo of two GIs; one of them was dying and the other was holding him in his arms and weeping. People were touched by this picture, and few, indeed, ever made any suggestion that there was a homosexual relationship between them. But this was suddenly the emergence of one facet of closeness between people. This kind of thing can be called "love," and it's not necessarily carnal at all.

We're also getting a lot more information about love; about what it is, about the peculiarities of what is called "chemistry." A per-



son can be absolutely desirable in every facet, fulfilling all fantasies, and yet nothing happens. The thing doesn't click. What is that "thing"? Well, people are beginning to understand the nature of that "thing" or at least that it exists. There is an aura that meets, or does not meet, with one's own. These have always been fascinating conjectures in fiction, poetry and art. There is now the so-called "new morality" where it's completely acceptable for two people to live together and nobody thinks anything of it, one way or the other. And with more and more couples, you don't really know if they're married or not, and it doesn't *matter*.

And suppose you did suddenly find out that they *had* been living together for years and had not been married. You don't stop them from playing with your children because of that. So we're beginning to be more tolerant of facts of this nature. They are still intangibles, but they are open to inspection now, they aren't whispered about. This is an extremely good thing. In addition, the expanded family, the multiple relationships, the tribalism, and so on, are beginning to emerge as possible lifestyles. I can only applaud this. In order to find out if a thing works or not, you try it.

Another thing that has become more acceptable, very much to the horror of some

rednecks, is the fact that the traditional family is breaking up. What the rednecks mean by family is "monogamous singlitude." They think that it's better for two people who *hate* each other with every breath they draw to stay together for the sake of the children... and that should not be so. It is the nature of things to change.

If you're looking for a Basic Truth, there's one for you. Everything is in flux. The cells of your body are not the same as they were four minutes ago. Everything changes. And what I call the *only* unnatural practice in existence, really, is the human politic. The human desire to build something which is forever. In spite of what you see in the magazines, diamonds are *not* forever. We sit here on a granite island, floating on a sea of hot mush, and these islands are banging into one another on a planet which is in motion around its primary, which is in motion in a galaxy, and the galaxies themselves are churning around like little bits in boiling water, and the space between them is filled with smoky gases, and everything is in motion. So why, then, should we assume that we can build thousand-year Reichs, and everlasting pyramids and mariages which will never corrode and/or break up?

"Up to now, the only way we've been able to conceive of a society is to make it static. This is what's wrong with all Utopias, why they've failed."

There is such a thing as stability, but to be natural, it has to be dynamic; the dynamic stability of a gull in flight, which must be in motion to be stable. And this is the *natural* law. To regard marriage as the cornerstone of civilization and civilization as a pyramid which is going to be everlasting and that cornerstone as the one thing that will hold it up permanently—this is absolute nonsense!

People grow and change; life grows and changes; mountains themselves grow and change. It isn't even a concomitant of life, it's a concomitant of *everything*. So why take

marriage and the family as one permanence? It isn't. It has to be stable and it has to be dynamic at the same time.

FL: But how do you learn the nature of flux? What about the constant search for "security"? Security in most people's minds means a stabilization, a static position in life.

"If you find yourself in a situation which is so comfortable that there are no questions you can ask about it . . . you just died."

STURGEON: This is why I use the image of the pyramid and the image of the gull in flight. It is not possible to build a pyramid, literally, on this Earth, which in time enough won't erode away into invisibility. But that gull-flight will always continue to exist in one form or another; the idea of dynamic stability. I know it's a shattering idea; that it seems like a totally radical, brand new idea, but it really isn't. It's the oldest idea there is. The whole universe presents *no other evidence* except that flux is the commonplace. From the births and deaths of stars to Brownian movement in a gas, from the very large to the very small, flux is the thing that's evident. In Hiesenberg's Uncertainty Theory, you can't measure closely enough so that your measurements won't ultimately affect the results—that's because of the flux of everything. Nothing stands still long enough to be examined really minutely. However, forces can be measured as long as they're in flux, as long as they're dynamic.

FL: Do you feel, then, that through history what we've been doing is fighting that force, and that in the future we'll learn to flow with that force, and relax?

STURGEON: That's right; to flow with it, that's the natural way to go. And stability *can* be built in a dynamic society. Up to now, the only way we've been able to even conceive of a society is to make it static, and this is what's wrong with all Utopias; why they've always failed, even in fiction. Because they build—from Plato's *Republic* on—toward a static society. And god will *not* have stasis. The Indian concept of Nirvana is more acceptable, I think, because it contains the Great Paradox; in the nothingness of Nirvana is everything—that everything and nothing are essentially the same. The I-Ching and that popular Scots rock singer, Donovan, both say that everything is part of everything, anyway; it's in one of his songs. And those religious sects which say "Thou art god" are saying essentially the same thing. Robert Heinlein, too, says it very often. The ultimate, absolute secret of the universe is not a "thing" but a process, which by definition is something in motion. So when we start to build marriages and societies and governments and make them perfect and finish them off, they stand still. And the moment they stand still, they are unnatural, and god will not have it; they will be smashed by the very nature of nature.

As far as predictions for the future, or at least a feeling for the future (there isn't a future; every moment we stand at the crossroads of a thousand paths going from us, every single moment), but as far as immediate prediction is concerned, you can have a better handle on it with this concept: Whatever happens, it's going to be something moving.

FL: Of all human relationships, sex has to be the most cloudy and covered with all sorts of weird mysteries.

STURGEON: That's right; deep secrets which are not secrets, and as soon as the kids find that out, they begin to doubt *everything* their parents taught them. I'll never forget a remark my brother made when he was eleven years old, and my stepfather was sounding off over the dinnertable about something or other, I forget what. And my brother suddenly sat up and his eyes got bright and he said, "Is that really so? I thought it was just one of those things you *learned*!" Heavy!

FL: Do you feel that we will finally get away from anything abhorrent about love or will there still be something that we'll balk at, in the future?

STURGEON: I think there will always be a current abhorrence to *something*; the levels change and the names of things change and what not. At one time it was purely a matter of being a Protestant in a Catholic neighborhood, which was sufficient for abhorrence. Somehow or other, human beings have got to abhor something, and sex, of course, and love, have always been easy targets for this kind of thing. Especially since people kept them secret so much, but they're not keeping them secret anymore. And that's my big argument for acceptance of natural human proclivities.

FL: What about your "Ask the Next Question" philosophy?

STURGEON: Well, I have a symbol that people have seen me wearing; it's my trademark. It's a silver medallion that is the letter Q with an arrow through it, and it means just that: Ask the Next Question. And it's the symbol of everything I've just been saying about the ongoing evolving and changing. It's the symbol of growth and change, it's a life-directive, a natural symbol. And on *any* subject, at *any* time, there are questions that

"A balanced, liberal-minded human being with the vaunted ability to see both sides of every question cancels himself out."

can be asked. If you find yourself in a situation which is so comfortable and so happy that *there are no questions* you can ask about it, you just died. You're *dead*! And then you can join the rest of the zombies around here who have stopped asking that next question: "What is it made of?" "Who said that?" "Who is it?" "Why is it that way?" "Why is it?" "What are the evaluations here?" "Why are your values different from mine?"

Always, *always*, there are questions that can be asked.

If you paste that symbol between your eyeball and your eyelid, and look out at your world through it, it becomes a very different kind of world, where you see things in sequence, where you can feel yourself as a link in a whole chain that runs from before the planet came into being and after it becomes a cinder. It's a natural sense of continuity with everything, because asking questions and getting an answer, and asking a question about *that* question is the whole history of human progress. You have a naked guy sitting in a cave, on some rocks, and he asks the question, "Why can't men fly?" Now, he, himself, is not going to fly, but he's asked the question. So what is the next question? "How?" And in a whole series of questions like that, ultimately we're crossing the continent in five hours.

"The specialness of science fiction will profoundly affect, if not become, mainstream literature. We are the elite . . ."

FL: Your philosophy seems based on the assumption that you've *already* asked a question. You are assuming that humanity is intelligent enough to have asked that first question already?

STURGEON: I'm sure that every human being initially has a question. He probably lies there in the cradle a few seconds after birth and says "What am I doing here?" and his whole biography stems from that; one moment of explosive "My god, what am I doing here?" Yes, that's it. It could just as well have been Ask the Question, but Ask the *Next* Question gives the idea of continuity that I wanted for it. It's a nice little symbol, too, and every autograph I do contains that symbol.

FL: You have the arrow going sideways through the Q, why is that?

STURGEON: It's pretty much the way we in the Western world read, from left to right. It's perfectly easy, for instance, if you happen to go to Israel, to put the medallion on the other way, so the arrow points left. But the idea is still the same.

I'd like to see the symbol really widely spread; widely understood. Obviously symbols like this are a little bit like the vines that Tarzan swings on; it's got to be there. It's something to hold onto when you swing, and then you go on to another symbol. But this one pleases me very much indeed.

FL: How do you see your world—a world you've created or the world you live in, within yourself—in relation to what we would term the "real world"?

STURGEON: I don't essentially see a huge difference. You know, if you could crawl behind almost anyone's eyeballs and look out onto the world as he sees it in the here-and-now, it would be, to you, a very alien place in-

deed. Fantasy really comes from that fact; you get a little glimpse of somebody else's day-to-day thing. And the fact that it comes out as dragons and monsters and Herculean guys with swords and so on; these are only symbols of something that most people see around them. I am quite sure of it. There may not be actual guys with actual swords, but it may be a hero-idea, or a politico, or daddy, or whatever. We all have fantasies, I think, which is why fantasy grabs so hard at the heart of so many people. As far as the future world is concerned, Fred Pohl said recently that humanity never solves any of its problems, it just adds more. And in a way, he's right. Whatever we can't cope with now, we're not going to cope with in the future, either, but we will add other problems on top

munication, because they have nothing like our investment in communications satellites, just one or two they put up for this very purpose, covering the whole subcontinent. They're in a position to get this kind of advanced transmission, and we're not, because they have not been stuck at that particular plateau.

It happens in other fields, too. For example, in education, when we established "norms" in the medium to bring children up to, and base our whole educational system on it, we have got to be overlooking those who do not conform; those who don't live in the medium, the so-called "normal," which is always a debatable thing. Children who have the ability to explode above and outside, we will push down to that level. It looks as if we

Without hesitation, knowing I would probably never come back and knowing that I would probably subject myself to all kinds of misery and hardship. But to be a part of a movement like that, I'd give anything for it to happen; I'd sacrifice *anything*. Incidentally, I think the destruction of Skylab is one of the most infamous things; it did not have to happen! That, and the fact that there is a pylon on the Moon with Richard Nixon's name on it, are to me the two most disgraceful facts I know of! And Proxmire, who says we've got to cut the fat out of the space effort. I cannot understand the purblindness of politicians who don't realize the exploding interest in science fiction and *Star Wars* and—excuse the expression—*Battlestar Galactica*, and all of these things. Any of these politicians could go to a toy store and see what the kids are growing up with, these days, and what it is that interests them. There is a whole generation growing up which is absolutely space-oriented, and they are now in a position to lay the foundations of something practical coming out of this, and they *cannot* see it! It's just unbelievable!

FL: One movie producer at Universal says that if science fiction films get too cerebral, no one will go see them.

STURGEON: That's very typical. People have seen science fiction all their lives, but they don't call it that. They'll say, "I've never seen science fiction."

"But have you seen *On the Beach*?"

"Yes."

"Did you see *Lord of the Flies*?"

"Yes, but that's not science fiction."

Isn't that incredible? If it's not *Star Wars* or *Superman*, it's not considered science fiction. People have a fixed idea of what science fiction is: zap guns, spaceships, lasers and stuff like that. Ultimately they will become aware of the fact that science fiction is inner space as well as outer space.

I do think that science fiction is going to ultimately lose its "club membership" aspect. Science fiction is now into poetry and drama and toyshops and music and everywhere. I think that it's a good thing. Vladimir Nabokov's latest novel is called *Ada*; it's the story of a world in which the Germans won the First World War and what happened to the world because of that. This is an alternate universe *science fiction* story, yet I've never heard anybody calling Nabokov a science fiction writer, although he's read a bit of it. And this whole idea of alternate universes and "what-ifs" and so on is the very nature of literature itself. It's the strongest aspect of science fiction, too. And it is the main aspect of science fiction that is permeating mainstream fiction more and more.

Science fiction fans consider themselves something special, and they are. We are the elite but we're becoming less and less special as we become more and more influential. The "specialness" of science fiction will profoundly affect, if not *become*, mainstream literature. Good heavens, when we start moving out to the stars and settling other planets, what is our mainstream literature at that point? What, then, will the science fiction writer be doing?

"Everything is in flux. The cells of your body are not the same as they were four minutes ago. Everything changes. In spite of what you see in magazines, diamonds are not forever."

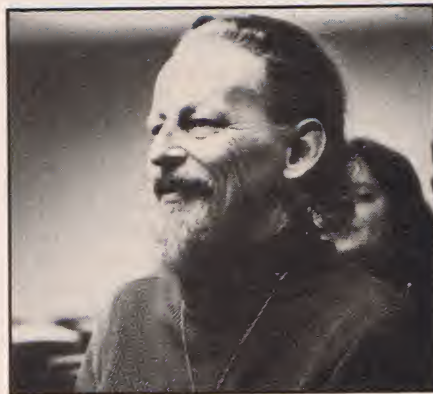


PHOTO CHARLES BROWN

of it and perhaps diversify it. Then the problems that we did have, that we didn't attack directly, will suddenly be solved, almost by default. You know, sanitation looks like a good idea, then it becomes a *moral* idea; in the meantime bubonic plague disappears. There are not only a lot of things like bubonic plague, which indeed were around, but there are many things that we can never know about, that just didn't happen because cleanliness is next to godliness. So human problems do tend to get solved as we go on and turn our backs on them.

I think a great many of our problems will be solved for us by this strange process of our moving on to something else. I'd like to bring up one thing about technology that has fascinated me for a long time and it seems to be more or less of an unknown factor: There are plateaus in the advance of a technology and they don't result from the lack of research or lack of understanding of the phenomena that make technology possible; rather, they tend to be economic factors. For example, we've put up billions of dollars in communications satellites. That is capital money that has got to be paid back in one way or another. During that time, you can improve on the state of the art in small details, but you cannot advance past it. That particular technology has reached a plateau and will stay there until the capital has been paid off and a profit is reached; at which point, if something becomes more profitable, then a whole new technique will leap ahead. But it is held at that space until the liens are paid off.

India as a so-called "underprivileged nation" is developing a direct satellite com-

are trying to bring all children up to a certain level of achievement; by and large that's true, but what about the ones who develop abilities and techniques outside of it? We don't permit them. That's what *More Than Human* is about, right? I wrote it 26, 27 years ago, about the fact that certain abilities can be developed if you can just keep them the hell out of the educational system. Now I don't know precisely what you can do with that; you can't regularize it, you can't bureaucratize it. But the fact remains that we stand in very great danger of leveling out the most explosive children, the cutting edge, of the development of the human species. This world was never moved or shaken by anybody but an obsessive nut, or a genius with a totally new idea.

FL: Where is the difference? There are probably people who are just as intelligent as the person who can lay claim to being a genius, but they are staid enough that they have not done any moving and shaking.

STURGEON: That's right. Progress comes from imbalance; it's the way you walk, a series of falling down and catching yourself with your foot. It's imbalance that moves the Earth and all of nature, not balance. A balanced, liberal-minded human being with the vaunted ability to see both sides of every question cancels himself out, as a social entity. He probably doesn't vote, because he can see both sides.

FL: Now that we are on the threshold of being able to take civilians up in the space shuttles, would you go?

STURGEON: More than that, if I had the opportunity to move into an L-5, I would.

Space-Age Games

A sampler of the best new wrinkles in electronic entertainment.

By STEPHEN J. SANSWEET

In the seven years since tiny white blips first were paddled electronically across home television screens, the business of having fun has been revolutionized.

Today's video games are akin to sophisticated computers that can be programmed with a growing library of games. And in the rapidly growing non-video area, you can shoot down randomly attacking flying saucers with a hand-held missile defense, play at least seven varieties of electronic football, fly a sound-alike *U.S.S. Enterprise*, challenge a minicomputer to chess or backgammon and track a thief by listening to him open doors or break windows.

But that just scratches the surface; there are more than 100 different electronic toys and games in stores today. This year, Americans will spend up to \$500 million on these items with prices averaging about \$25 to \$60 but going as high as several hundred dollars. Manufacturers say this is only the start. While dolls and trains will always be available, they too will succumb to space-age computer technology. Can you imagine Little Baby Goo-Goo balancing a checkbook?

At the heart of most of the new toys and games is a microprocessor, a silicon chip that's only one-twentieth of an inch square. Each chip contains the equivalent of 10,000 transistors and is, in effect, a computer brain.

In the beginning there was *Odyssey*. Magnavox introduced its primitive television game in May, 1972 and went into nationwide distribution just before that Christmas. In the next few years other manufacturers jumped into the market and the price of video games dropped. Then, two years ago, Mattel came out with the first hand-held electronic games. Its Football game became harder to find than clean air in Los Angeles. Milton Bradley's similar success last year with its Simon sound and light game assured that this would be a big year for electronics.

Electronic toys and games run the gamut



Today's computer games are more than fancy electronic toys. They stimulate the players' eyes, ears and minds.

of interests from pre-schoolers to adults. They test memory, instincts, tactics and logic. They let players relax, gamble, learn, be combative or challenging. But most of all, the really good ones are fun to play.

A smart shopper should consider certain things. Some games offer more features or game versions than similar items. Check the package to determine how the game plays, the age range and the number of players. Do you need two people or can you play against the computer? Does the theme interest you or the person you're shopping for, or is it just a novelty item? A good game should be simple enough to provide fun from the start, but not so easy that it becomes boring after a few hours or days. The best games have different skill levels or randomizing elements.

Price is a key factor. While some single-sport video games have been discounted to as little as \$10, you tend to get what you pay for. The best programmable video games sell for \$180 to \$300. Hand-held games go for \$20 to \$40 and some other electronic items top that. It might pay to shop around. For example, a Los Angeles toy hunter recently found Mattel's Sir Galaxy robot (it walks by remote con-

trol and talks in your voice) selling anywhere between \$60 and \$110.

What follows is an eclectic guide to some of the more interesting, innovative or just plain fun electronic toys and games now in the stores. A few are popular holdovers from last year, but most are new.

Video games have fallen on hard times, but there's still keen interest in the top-of-the-line programmable games. The newest is **Mattel's Intellivision** (about \$250), which has streamlined and versatile control modules that are as easy to use by left-handers as righties. Mattel offers game cartridges in five areas: sports (baseball, football), strategy (backgammon, checkers), action (Space Battle), gaming (blackjack, roulette) and children's learning (math and spelling). The sound effects and colorful action

figures with every game almost make it seem like you're viewing animated cartoons. With the addition of a Keyboard Component (also about \$250) and pre-programmed cassettes, Intellivision has home computer capabilities.

Bally Manufacturing's Professional Arcade (about \$300) was introduced last year and is similar to Intellivision. On-screen characters are capable of 360-degree motion, and both scores and playing times can be programmed. There's a full range of sound. In the Gunfight game, for example, cowboys duck behind moving cacti and when they're hit, the machine plays "Taps" or "The Funeral March." The Arcade can also produce 256 color variations on color television sets.

The best-selling **Atari Video Computer System** (about \$180) now has a library of 32 game cartridges ranging from *Indy 500* to *Superman*. In that game, Clark Kent has to change in a phone booth, stop Luthor from blowing up the Metropolis Bridge, catch the baddies by using X-ray vision and dodge deadly Kryptonite satellites. Atari games can be played by up to four people, or by one

person against the game brain. A favorite game—and maybe the most addictive video game ever invented—is Breakout, in which a player has to smash his way through a colorful multi-layer wall of bricks.

There are dozens of games this year in the hand-held category (about \$20 to \$40). For armchair athletes, **Mattel** has topped itself with **Football II**, which includes a full kicking game, the ability to manipulate the “runner” in all directions and a passing option that features an offensive receiver. The built-in computer controls the action of six defensive players (blips of light) that try to tackle your blip—uh, runner—and intercept your passes. There are sound effects, a scoreboard and four playing speeds.

Also new from Mattel are **Baseball**, with pitch, hit and run controls; **Hockey**, with directional shooting and digital scoring; and **Soccer**, with a computer-controlled defense. **Armor Battle** and **Sub Chase** join last year's **Auto Race** and **Battlestar Galactica Space Alert** (in which the Battlestar fires blips to intercept a Cylon Raider blip attack).

Entex of Japan has a series of hand-held games that can be used by two players at a time or solitaire. **Baseball** has a remote pitch-in module that has buttons for a fast ball, change-up, knuckler, curve or slider. The batter can walk, strike out or hit the ball; how far he goes is decided by the computer. **Baseball 2** adds continuous scoring for both sides and a base-stealing feature. In **Space Battle**, each player tries to defend his position with battle cruisers that fire laser torpedoes to destroy attacking fighters. There are also **Soccer** and **Hockey** two-player games, and **Poker**—with the computer as dealer.

Bambino, another Japanese toymaker, wins the prize for the most futuristic looking games. The hand-held games have an almost sculptural quality and the even more important attribute of maintaining their challenge after continuous play. Instead of red blips of light, Bambino's games have small graphic displays.

The **UFO Master Blaster Station**, for example, shows the player's missiles firing at incoming UFOs. There's a visual explosion



Mattel's electronic hockey game.



Sensor Word Game: 21st century Scrabble.

for every direct hit. Scoring depends on how many UFOs are destroyed in 80 seconds and how close to their home base they were hit. If the missile defense is penetrated by the aliens, it's all over. The tricky UFOs attack alone and in pairs and sometimes veer just as a missile is about to strike. The game is programmed for more than 100 million attack patterns.

Bambino also offers several sports games; a **Safari** game for younger children (they cage the 10 different animals, rather than shooting them); and **Space Laser Fight** which pits two ducking, jumping and firing galactic warriors against each other and a computer-controlled moving obstacle.

Milton Bradley has combined the kinetic display of video games with the convenience of hand-held games in its new **Microvision** line. The hand-held mini-video game (about \$51) has its own screen with separate cartridges available (about \$18 each). Microvision comes with **Blockbuster**, which is similar to Atari's Breakout. There's a **Star Trek Phaser Strike** game in which the player uses his “phaser” to shoot down alien space ships as they fly across the screen. There are also a couple of puzzle cartridges, pinball, bowling and “Vegas Slots.” The games

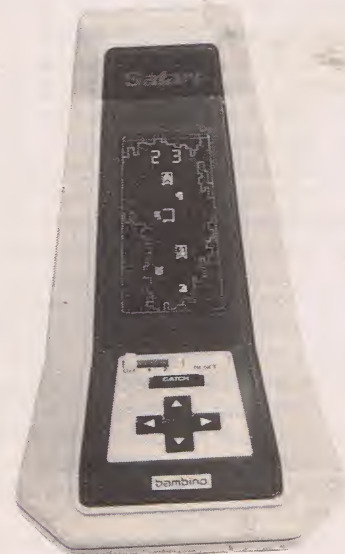
have on-screen scoring.

Lakeside Games' Computer Perfection (about \$40) is a nifty looking modernistic sphere that challenges wits and memory. Players must match random numbers and lights in proper sequence. A good memory is important, but so is speed. You can play against the machine, another player or both. The game, it is noted, “talks back” to all challengers.

Parker Brothers has updated its classic Clue board game with a fascinating and delightfully challenging game called **Stop Thief** (about \$30), one of this year's best examples of the creative use of electronics in games. Two to four players have to track a thief who has pulled off a heist at one of 19 locations on the game board. They are aided by visual and audible clues from the electronic Crime Scanner. Players can hear the thief open doors, break windows, hop a subway, etc. When a player thinks he knows the thief's location, he calls in the cops (sirens wailing), hears an electronic shootout and waits to see if an arrest is made. One very nice touch Parker Brothers offers buyers of all its electronic games is a toll-free number to answer any questions about the technological toys.



Above: Star Bird Avenger & Star Bird Intruder. Left: Entex's Electronic Poker. Right: Bambino's Safari.





Atari's video computer system can be programmed for 32 games.



A child becomes an intergalactic pilot with Playskool's Star Rider.

Ideal is offering **Electronic Detective** (about \$45) in which each player grills the computer to obtain clues about 20 different crime suspects. Using the clues and a scratch sheet, players deduce their way to the culprit. The computer won't lie, but can serve up deliberately misleading clues. **Ideal's Maniac** (about \$45) is a four-game audio-visual device. **Sounds Abound** requires listening to a series of rapidly repeating notes and hitting the lever when the game beeps that many times. In **Look Twice**, players have to know when a light pattern is repeated. **Musical Maniac's** winner is the first player to hit the lever when a melody stops. And in **Time's Up**, players have to measure the exact length of a tune.

The new **Sensor Electronic Word Game** (about \$30) is from **Selchow & Richter**, the Scrabble people. The object is to guess an opponent's (or the computer's) hidden word in the fewest turns. The word is deduced letter by letter as the computer flashes clues about the position and accuracy of a guessed letter. Two-to seven-letter words can be programmed into Sensor. The computer is pre-programmed with four-letter words only, most of which deal with rockets and outer space.


That brings us to science fiction and space toys. **Playskool's Alphie** (about \$25), an electronic teaching robot for 3 to 8 year olds, is back with new games and activity sets. Alphie plays tunes and question-and-answer and board games. New and impressive this year is **Playskool's Star Rider** (about \$70), a large plastic "astronaut couch" that will fit children 3 to 9 and be the envy of their older brothers and sisters. The toy rotates 360 degrees and has an electronic panel with great space sounds, lights and visual displays.

For *Star Trek* fans, **Milton Bradley's** South Bend subsidiary has new **Star Trek Phaser Guns** (a set of two for about \$24) modeled after the sleek versions used in the movie. The Phasers emit an infrared beam for up to 50 feet and several different sounds, including an explosion when another Phaser is hit. Also available will be a 20-inch-long electronic **U.S.S. Enterprise** (about \$25) with flashing light, firing Phaser and accelerating engine sounds. **Milton Bradley** itself is bringing out two new versions of last year's popular **Star Bird** rockets, which have the same features as the Enterprise. The **Star Bird Avenger** and the **Star Bird Intruder** (each about \$24) have

"laser rays" that are temporarily disabled after making a hit on any reflective target.

Kenner has added a **Star Wars Electronic Battle Command** (about \$35) to its huge line. Players try to acquire Force units against the computer or as many as three opponents by simulating dog fights between X-Wing and Tie Fighters.

There are also a number of new, miniature electronic pinball games; a more powerful and less expensive (about \$90) electronic **Chess Challenger 7** game from **Fidelity Electronics**; **ROM** (about \$25), a 13-inch space knight action figure from **Parker Brothers** with realistic sounds and lights; and a number of electronic musical toys for all age levels and at various prices.

These are just some of the highlights of what is available now and a preview of what is certain to be an electronic future for Toyland. Already technological toys have increased the average age of the buying public and have made toy sales a year-round business. As the small chips that provide the brains for these games become more plentiful (they're in short supply now), and as more toy designers start thinking electronic, toys and games will become even more sophisticated, challenging and fun! 



Left: Maniac and Electronic Detective.



Above: Parker Brothers' Stop Thief. Right: Fidelity Electronics' ROM.



News of the Next Decade

Are you ready for the new decade? Do you know what to look forward to—and what to look out for? Just so you don't enter the '80s entirely unprepared, check out this list of technological breakthroughs predicted for the next ten years. The list is derived from a 1978 survey conducted by the Economics Department of McGraw-Hill Publications Co. The information comes from technical researchers, planners and forecasters in industry, government and technical

institutes. The dates correspond to the year of technological breakthrough; widespread use of each breakthrough will depend on economic feasibility and will generally follow a few years after the breakthrough.

We also queried a number of leading futurists for their thoughts on what the decade ahead holds. Their observations are presented here.

So get ready for the 1980s—it's going to be an exciting decade!

BREAKTHROUGH AEROSPACE:

- 1982**—Temporary manned lunar base (three people, 30 days).
- 1983**—Direct-to-viewer TV satellite broadcasts.
- 1985**—Next generation of supersonic transport.
 - Erection of large structures in orbit.
 - Energy systems in Earth orbit.
 - Establishment of permanent automated research stations on nearby planets.
- 1989**—Reliable 30-day weather forecasts.

BREAKTHROUGH CHEMICALS AND PHARMACEUTICALS:

- 1982**—Processing plants designed for zero pollution.
- 1984**—Development of safe, non-digestible sweeteners, flavor enhancers, etc.
- 1985**—Economic desalinization of water.
 - Scientifically designed methods for removal of solid waste materials from cities.
 - Molten-salt-absorption for control of industrial air pollution.
- 1990**—Effective weight and appetite control.
 - Biochemicals to cure mental illness.
 - Controlled and/or supereffective relaxation and sleep.
 - Chemical methods for improving learning and memory.
 - Chemical control over some hered-

itary characteristics through molecular engineering.

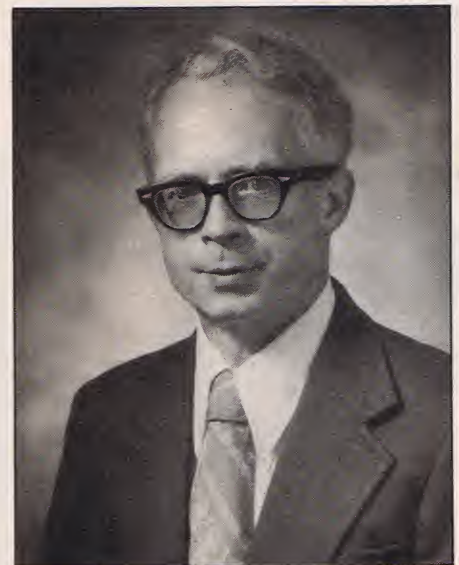
- Replacement of petrochemically derived products by similar products derived from other raw materials, such as animal fats and vegetable oils.
- Hydrogen as a commercial source of energy.
- Process plants located offshore (man-made islands and sea-bottom installations).

BREAKTHROUGH CONSTRUCTION:

- 1981**—Highly automated machine tunneling in hard rock.
- 1982**—New uses for underground tunnels for private and public transportation.
- 1988**—More rapid, less expensive tunneling methods.
- 1990**—Cargo pipelines for transporting any goods.

Edward Cornish
is President and founder of the World
Future Society and editor of *The Futurist*.

The 1980s will be a difficult decade, especially in the economic area, because world population growth and industrial development have been overwhelming the Earth's resources. Many nations will be hard-pressed to provide food and jobs. Economic difficulties will lead to political unrest with revolutions likely, not only in the poor countries but also in the rich. There is, in my judgement, a high likelihood that we will face another Great Depression during the 1980s. Fortunately (or unfortunately), government officials generally refuse to recognize depression as a possibility and if it does happen we will be just as unprepared for it as we were back in the 1930s. On the brighter side, the 1980s will probably offer us many new technological wonders, such as videocassette recorders and other electronic marvels in every home, a "slim pill" to reduce obesity without dieting, the replacement of surgical abor-



tions by abortion-inducing drugs, and the first successful implantation of an artificial heart in a human being.

LOOKING FORWARD TO THE '80s

F.M. Esfandiary

is a tele-educated futurist philosopher and the author of *Optimism One*, *Up-Wingers* and *Telespheres*.

In the 1980s the world will continue to stream ahead—faster and faster.

The beginning of cheap—clean—limitless solar electrification.

Massive switch to cybernation—remote control systems—robots—intelligent machines.

Accelerated spread of personal—global—decentralizing telecom.

The beginning of freely via jet pack—flying platform—rocket belt.

Extensive use of implanted electrodes in the body for self control of pain and continuous self monitoring of body functions and brain waves.

Accelerated upsurge of new lifestyles: telegenesis—shared parenthood—singles—nonexclusive couples and triads—mobilities—global life.

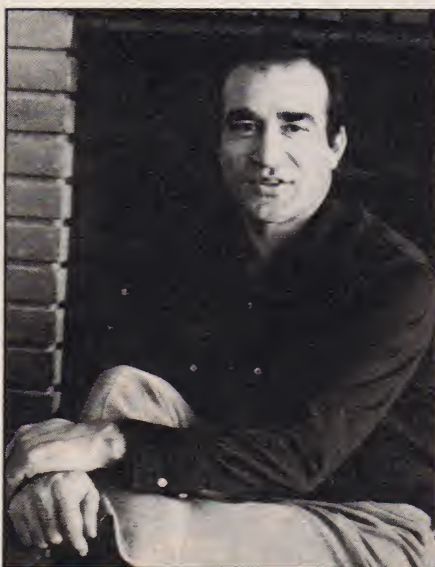
Accelerated flow to regionalism—common markets—planetization.

Extensive space colonization—scores of civilians living and working in Earth orbit for months at a time.

Dramatic increase in longevity—tens of millions living over 100 years.

These and other advances will continue to reinforce one another creating a powerful cumulative force for change.

In the 1980s telecom will grow more



and more universal—people more and more liberated—resources more and more abundant—technology more and more decentralized—infrastructures more and more global—human consciousness more and more cosmic.

No government—no world power—no military/industrial complex—no church or other orthodoxy can any longer stop or even slow down the cumulative thrust of progress—as we move up to the 21st Century.

BREAKTHROUGH ELECTRONICS:

1980—Electronic voice identification.

1982—Electronic distribution of most business mail.

—Electronic shopping from home.

—Automatic polling of large populations.

—Facsimile or electronic distribution of library contents.

—Flat solid state television picture tube.

1984—Selectable TV programming on demand.

1985—Multi-phase health screening.

—Use of electronic impulses to control pain.

—Electronic prosthesis (artificial limbs).

—Wrist-watch size TV receivers.

—Personal portable telephones.

—Automatic language translation.

—Common English language computer programs.

—Computer controlled home.

—Educable computer (computers that learn).

—International resources monitoring, and international disaster monitoring and alarm systems.

1988—Sound and video recording without moving parts.

1990—Automatic control of automobiles and trucks on highways.

—Artificial eyesight for the blind.

—Holographic 3D television and movies.

—Multi-purpose programmable robots.

Herman Kahn

is Director of the Hudson Institute, a future-oriented think tank, and author of *The Next 200 Years*.

The next decade could very well be known as the "Sobering '80s," at least for the United States and the developed world. Both have entered a period which I describe as an epoch of malaise. We won't be sick and we won't be well—but we will certainly feel more than a vague degree of uneasiness.

During the next decade, we expect economic growth in the advanced capitalist and communist countries (containing one billion people) to slow considerably, to as little as 2.5 to 3 percent. However, we believe that middle income countries like Korea, Brazil and Mexico will continue to do quite well, growing at more than 5 percent, and will become a driving force in the world economy. The income gap between rich and poor countries should narrow considerably as a result.

BREAKTHROUGH GROUND TRANSPORTATION:

1982—Automated railways.

1985—Automated urban transit.

—Multi-unit truck "train" running on its own highway traffic lane.

—Cars run by gas turbine.

—"GERM" vehicles (ground effect reaction machines, or hovercraft).

1986—High-speed tracked levitated vehicles.

1988—Hybrid-powered car.

1990—Atomic energy powered railroad.

BREAKTHROUGH PLASTICS:

1980—Cost-effective plastics, stronger and lighter than metals.

1983—Plastic automobile body and frame.

1984—Noncarbon based plastics.

1985—Carbon base polymers synthesized from sources other than petroleum, gas or coal.

—Molecular tailoring to create polymers with service temperature ranges in excess of 1000 degrees F.

—Waste reclamation technique capable of "mining" existing landfills for plastics, metals and other slow-degrading materials.

—Plastic military/commercial airframes.

—Polar cities based on plastics foam insulation.

1988—Plastics-covered deserts for enhanced agriculture.

1989—All plastic trains.



LOOKING FORWARD TO THE '80s

BREAKTHROUGH MEDICAL AND BIOLOGICAL:

- 1980—Bank for storing organs for transplant.
- 1983—A practical blood substitute.
- 1984—Universal effective and safe fertility control.
- 1985—Direct electronic communication with/and stimulation of the brain.
—Long term use of a drug to prevent cancer from developing.
—Cancer cure.
- 1988—Effective immunization against viral diseases.
- 1990—Creation of a primitive form of artificial life.
—Bio fuel cell.
—Transplantation of the nucleus of human cells.
—Chemical control of senility.

BREAKTHROUGH METALS AND MINING:

- 1982—Recovery of minerals from the seabed.
- 1985—Automated underground mining.
—Continuous underground mining machinery for "hardrock" ores, e.g., copper, iron, etc.
—Use of lasers, ultra sonics and high frequency currents for drilling, crushing and grinding rock.
- 1988—Significant additions to present large-scale scrap recycling.

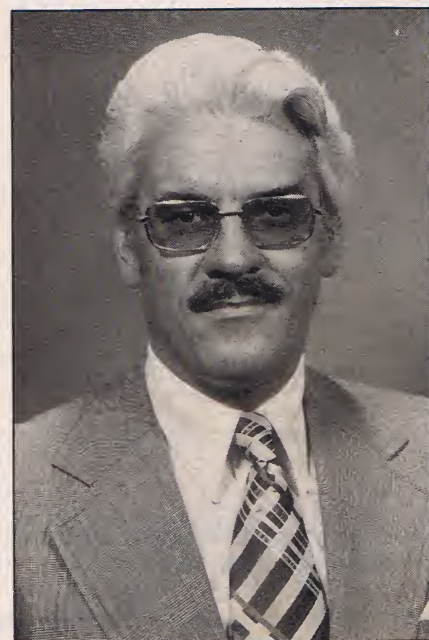
BREAKTHROUGH TEXTILES:

- 1982—Non-woven textile building materials.
- 1985—Man-made "cotton" with the properties of natural fiber.
—One-piece molded garments.

—Fibers and fabrics that will respond to temperature changes by either opening up or closing their structure.

1987—Fibers that change color.

Jesco von Puttkamer is a senior staff scientist with NASA who specializes in future planning; he is also science advisor for *Star Trek—The Motion Picture*.



As the decade of the sobering Seventies is coming to an end, I believe we're standing at one of those few but fatefully important junctions in our evolution. On one hand it may lead into another epoch of "business as usual." On the other hand, it could open up an entirely new, exciting era for humanity. Will we opt for the former or the latter?

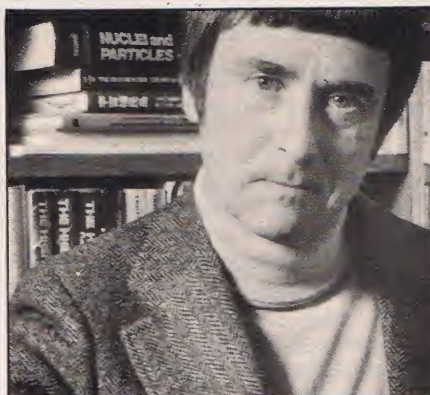
We're been at similar nexus points before: Back when the introduction of the railroads, 100 years ago, opened up this great continent to industry, trade, civilization and culture. Or more recently, 45 years ago, when the DC-3 opened up the world to air travel. For me 1980 is the Year of the Shuttle, and on its flight decks I see us entering into a new evolutionary stage where the third dimension of space becomes part of our natural habitat. Full emergence is still a ways off, but we are about to take the first daring step—and the promise beyond is immense. It's the dawning of a new era—the era of space humanization.

We're growing and learning and maturing faster than at any time before. We're living in the most exciting time ever, and people 45 and 100 years from now will look back at us with nostalgia and awe, and they will call our era the New Golden Age. Because it was then when mankind first stepped out into space. Aren't we the lucky ones?!

Gerard K. O'Neill

is professor of physics at Princeton University, author of *The High Frontier* and leading proponent of space industrialization and colonization.

Space is an energy-rich, materials-rich environment, and the first steps toward using those resources are likely to be made in the '80s. Calculations and hardware research already confirm that lunar materials can be processed in space with solar energy in an economical way to build products, for example large power satellites. By the 1980s the Shuttle will be flying, the Soviet Salyuz operations will become even more routine, and there may be manned operations in space by other nations, for example the Japanese or Chinese. Following a decade of hesitation and legal skirmishing, the breakout into space is likely



to become a headlong rush by the late '80s. Whether the U.S. takes part is likely to be an election issue by '84 or '88, and may be settled by the fear that the U.S. cannot afford to be left out.



Robert McCall

"Gravity is an enemy in a sense," says Robert McCall, space artist extraordinaire, "because it really does drag us down, and as we grow older and weaker, we are pulled closer and closer and finally back into the dust from which we came. I think man's life will be prolonged when he can be free of the bounds of gravity."

Bob McCall is well known for his breathtakingly realistic spacescapes and spacecraft. However, one of McCall's greatest contributions to the anti-gravity movement is his concept of floating cities. He has painted an entire series of these vast, ambulatory structures, and if they somewhat resemble mechanized clouds drifting over the arid ground, the similarity is not completely coincidental.

"Driving across the Arizona desert on a sunny afternoon," relates McCall, "I saw these marvelous flat-bottomed cumulus clouds that looked like beautiful cities in the sky. I thought I would make a big city



or architectural complex to look like the clouds and not worry about the fact that it's an impossibility and may forever remain so. But on the other hand, who knows? If we can land on the Moon and do things that we never dreamed of, why not be able to control the effects of gravity?"

As the artist imagines them, these floating cities would be largely independent and self-sufficient, not dependent on Earth's ecology for sustenance (and therefore lessening humanity's already harmful effect upon

that same ecology). Huge apartment complexes could house as many as half a million people, and parklands and other open areas would be contained under huge transparent domes.

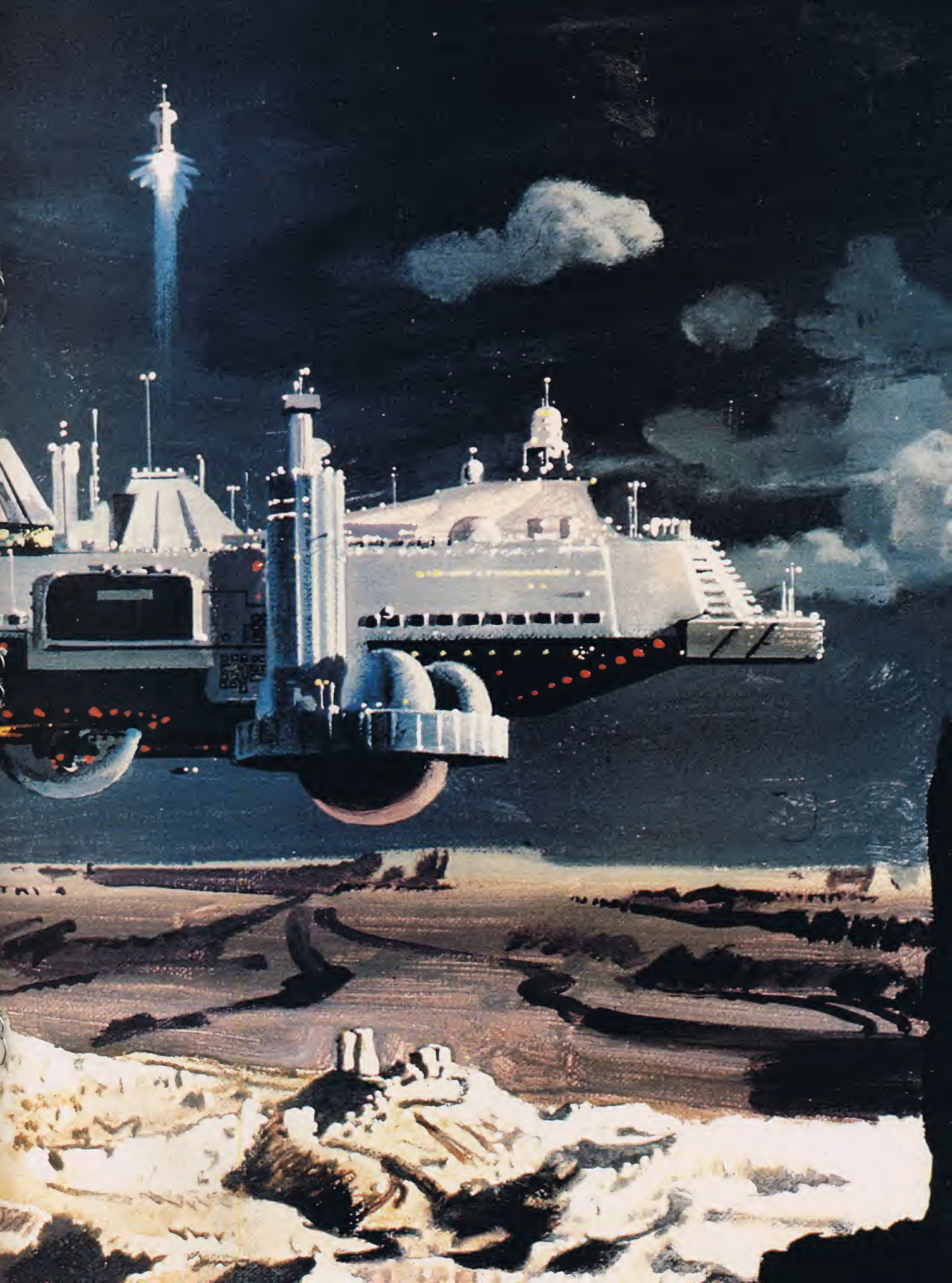
The cities pictured here are actually specialized transportation centers. These facilities, unlike today's earthbound airports and rocket bases, would have a great advantage in that they could be easily moved from one area to another, depending on need, and then suspended there indefinitely. Besides a vast array of sophisticated transportation systems for

air and space travel, they would also contain housing for employees and visitors, and passenger services such as hotels, restaurants and entertainment facilities. Viewing McCall's detailed and beautiful artwork, it is easy to believe that one day the principle of antigravity *could* be discovered, and that these floating cities might become an everyday sight around our globe.

Recently, Bob McCall has been concentrating on more earthbound, if equally fascinating, projects. Last summer he completed a 72-foot-long mural at NASA's Johnson Space Center in Houston, depicting the past, present and future of space flight. And he has just finished collaborating with special effects wizard Doug Trumbull on the fantastic finale of *Star Trek—The Motion Picture*. Between stints on various movie projects, he continues to bring futuristic scenes to life on canvas from his home/studio in Paradise Valley, Arizona. The street he lives on? Moonlight Way. 

Centerspread: "Antigravitational Transportation Center" © 1979 by Robert McCall





INFORMATION FOR THE '80s



The two-way television system allows viewers to participate as well as watch, but its effect on our lives could be more than mere entertainment.

By BARBARA KRASNOFF

Are you one of those people who hold loud, one-sided debates with the President during his televised speeches? Do you writhe in frustration because you're sure that *you* could do better than that idiot contestant on the game-show? Take heart! There may be a Qube in your future.

Qube is the experimental two-way television system which, according to its promoters, is not just another improvement in the current, network-oriented method of video viewing, but is actually a whole new utility. Owned and operated by Warner Communications, Inc., the major film and television production corporation, Qube was first introduced to the public on December 1, 1977 in the "typical" middle American city of Columbus, Ohio. Since then, it has become a medium of education for children and adults, served as a marketplace for goods and opinions, polled citizens on their views on issues ranging from marijuana consumption to urban renewal to the name of a new baby, provided consumer information and talent shows...and has broadened its technological range to provide police protection, fire alarms and act as a medical watchdog for the elderly and infirm. Depending on your point of view, it is either a new world in the art of communication or the infancy of Orwell's 1984 telescreen.

A typical subscriber is provided with a small, limited-capacity computer terminal/selector console about the size of a paperback book. This piece of hardware makes available 30 channels of network, community and premium viewing—for a monthly fee of \$10.95. There are also five

response buttons which make it possible for the viewer to answer multiple choice and yes/no questions, ask for more information or indicate a willingness to receive a certain service at home.

In fact, much of the popularity of Qube among the population of Columbus is attributable to the new services that these five buttons represent. Unlike many of today's

new electronic devices, the Qube system is not just a new toy—those five push-buttons are directly affecting the lives of the viewers in ways that many see as highly positive.

Most of these services are being provided through the ten community stations. One in particular is worth a closer look: the *Consumer Information* network, which provides subscribers with consumer news, price comparisons and, more important, a forum through which they can express their dissatisfactions and find answers to complaints. The man behind all the action is Jon Steinberg, who also appears regularly on his own show as "Mr. Qubesumer." Steinberg, who did a major investigation into drug abuse in the military during the Vietnam war, has dealt with a variety of problems and, in so doing, has had a major impact on local lives. For example, in the case of an advertisement pushing an expensive "miracle" flour, Steinberg used Qube's talk-back system to collect a tally of people bilked by the company; enough viewers offered to testify to initiate an investigation which led to the eventual disintegration of the company. Steinberg also appears on Qube's teenage program, *America Goes Bananaz*, in a consumer-oriented segment. It was on this program that he was not only able to warn teenagers about a widely advertised but ineffective contraceptive (emphasizing his argument with a tally of over 30 girls who admitted to becoming pregnant while using the product), but was instrumental in the arrest

of a local rapist by convincing several young women on the air to aid the police.

Consumer Information is not the only outlet for pushbutton-happy television mavens. One of the most publicized uses of Qube to date took place during President Carter's speech last July 15th, when more than 7,000 subscribers used their consoles to express their opinions of the president's sentiments; thus providing Carter and the news media with instant feedback. For example, when asked how they felt after the president's speech, 61 percent answered optimistic, 18 percent pessimistic and 21 percent said they were confused. Not a scientific or representative poll,



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true; but the implications of a similar nationwide hookup could have far-reaching effects on our political system—not to mention the effect that instantaneous viewer reaction to programs could have on the Nielsen Corporation.

Through their consoles, Columbus viewers have also expressed their opinions to Ralph Nader, helped rock musician Todd Rundgren reorder his concert format, collaborated with a choreographer in the planning of a dance number, influenced the decisions of the characters in a soap opera, and given the hook to their neighbors in a *Gong Show*-type program.

A very large feather in Qube's cap is their innovative children's programming. It began with *Pinwheel*; a low-key, nonviolent, nonsexist show for preschool youngsters that followed a format impossible for that of network television: it ran continuously from 7 a.m. to 9 p.m. daily. This show, which was actually a 160-hour video "loop," used puppets, live-action films and animation in three-minute, unconnected segments that could be viewed independently of each other (in other words, the program has no real beginning or end). According to Dr. Vivian Horner, vice president of program development for Warner Cable Corp. and the creator of *Pinwheel*, "It's a channel you feel free to let a child watch, let a child delight in. . . . Our intention was *not* to keep kids glued to the set."

This format of children's programming has proved so popular with commercial-beset parents that Warners has expanded that idea into a 13-hour daily television show for regular cable viewers across the nation called *Nickelodeon*; its schedule includes *Pinwheel*, *America Goes Bananas* and several other programs developed for various age groups.

All the above is concentrated on the ten channels that make up the community stations of Qube. In addition to this, and to ten channels of normal network programming, subscribers have available another ten channels of premium programming—in other words, you get what you pay for. Depending on the program selected, viewers are charged about 50¢ to \$3.00 for using this service—and the computer keeps careful track of the amount due, sending a detailed bill each month. (A subscriber has two minutes to change his or her mind, so there are no charges for accidentally hitting the wrong button).

Premium selections range from the sublime to the tasteless. On one hand, theater enthusiasts can view opera, dance and drama, and film buffs can choose from either first run flicks or old movie classics. For less discriminating tastes, a channel labeled Adult Films runs a series of softcore porn (if it wasn't soft to begin with, it is when it runs on Qube; all films are carefully cut to fit an "R" rating). This last is strictly optional; upon re-

quest, the station can be blocked by interference to avoid sneak peeks by curious youngsters. (Another safeguard for the child-inhabited household is the Qube key, which fits into the top of the home console and disconnects all pay programming—so that parents won't have to worry about running up a bill when junior merrily plays *Let's Push All The Buttons*).

Warner is now also offering safety-conscious, Columbus subscribers a new security system, consisting of a burglar alarm, a fire alarm and a medical alert system, all utilizing Qube's sophisticated computers.

In the case of the burglar and fire alarm systems, the home is fitted with various touch and infrared sensors and/or smoke and heat detectors. If one of these devices is tripped, it immediately sets off an alarm at the police or fire station, as well as a loud siren at the residence in question. The computer also quickly provides the appropriate authorities with a print-out detailing the address, number of residents, their mobility, the location of the nearest fire hydrant, etc.

The medical alert system consists of either buttons placed strategically around the home or a small transmitting device the size of the silver dollar which can be carried on the person and is operational within 150 feet of the house. When pressed, these devices will prompt the computer to send out an alert and a listing of pertinent medical data. This last proved vital in the case of one elderly woman who was stricken with a heart attack while waiting in her doctor's office. The office was equipped with the medical alert system, the "panic button" was pushed, and an ambulance arrived within three and a half minutes.

The cost of this security system (depending on the type chosen) runs from \$99.50 to \$250 for equipment and installation, with a monthly charge running from \$10 to \$12.50.

"We are also in the process of developing an energy management system to control heating and air conditioning," says Miklos B. Korodi, Qube's operating vice president and general manager. "This system may be projected to save 10 to 30 percent of your electricity bill on a monthly basis by, let's say, simply cutting off your hot water coil at night and kicking it back on at seven o'clock in the morning."

The hardware behind all this futuristic programming is hidden within Qube's main studio facility in Columbus. The large building, formerly a warehouse, is now an elaborate complex holding three television studios and the four sophisticated computer systems that, with the home consoles, make up the Qube network.

The main computer, also known as the polling computer, maintains the entire system of 30 channels, checks for problems and gathers the billing and two-way response

data. In addition, every six seconds the computer scans all the home systems asking the questions: Is the television set turned on? What channel is it tuned to? What was the last response button touched?


A second system, the studio computer, compiles lists from the two-way response information and handles all questions asked to home viewers.

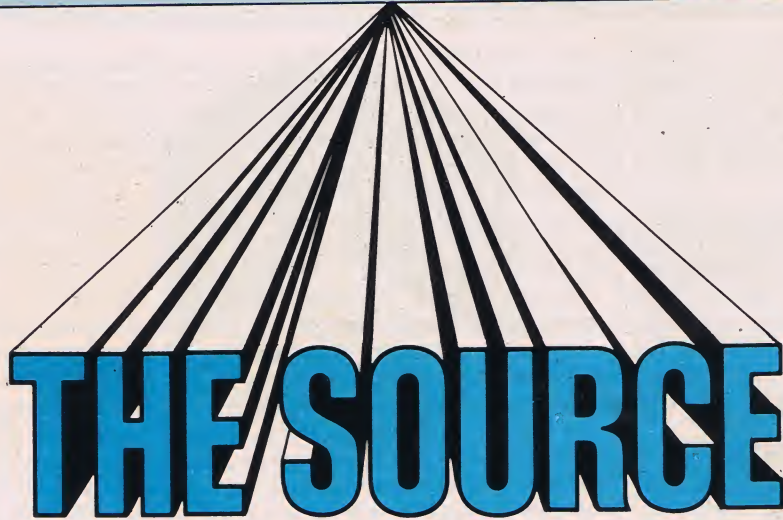
These two are the most important so far as subscribers are concerned. In addition, there is a dual function computer for back-up purposes, and a fourth computer for financial data and marketing and technical analysis.

It is in the gathering of information and responses that the important questions lie: At what point is the privacy of the viewer violated? Since the computer is capable of monitoring each response (and, in fact, does so), what is to prevent the collection of information on a person's responses to various sensitive political, social or personal questions? Or is the only safeguard simply not to respond?

Gustave M. Hauser, chairman, president and chief executive officer of the Warner Cable Corporation, has confronted these issues many times. "I am very concerned about the privacy issue involved with Qube and I believe that we have taken steps to insure that no one's privacy has been or will be violated. We are doing far less with computers and the tracking of people than a lot of organizations. . . . The only records we keep are billing records." All others, according to Hauser, are wiped out by the computer—except when they are made for polling purposes, and in these cases the subscriber is warned several times.

Another possible problem is the way questions are framed through Qube's yes/no pushbutton system. A carefully structured question could provide politicians with instant, albeit misleading data. Consumer advocate Ralph Nader, who appeared on one of Qube's talk shows, agrees. "There is a problem with this type of source control that allows it to dominate advocacy," Nader says. "It's very premature, and a lot of functions have to be worked out. But I see it as primarily a polling feature more than a two-way democratic discussion. You can only get that in person or by telephone."

Meanwhile, whether or not Qube is an actual danger to public privacy, 30,000 out of a possible 104,000 households are now busily taking classes, judging talent shows and complaining about the cost of living. The next two markets for the Qube two-way television system will be Houston, Texas and Cincinnati, Ohio—where viewers will be given a choice of 36 talk-back cable channels. Considering the effect of one-way TV on this generation, the advent of two-way TV is certain to play a large part—one way or the other—in shaping our future. 



THE SOURCE

The next indispensable utility for your home will be the information utility—and you can plug in today.

By CHRIS KELLER

Maybe you already have a personal computer in your home; maybe you're waiting until next year... But all of a sudden the home computer is affordable, within the price range of most middle income households. Now what do you do with it once you've got it?

The big glitch in the home computer boom is still the software, the programming that will make the computer do something more useful than deal you a hand of blackjack.

As a *Wall Street Journal* writer lamented last spring, "I got a spiffy \$599 home computer for Christmas. It stopped playing blackjack with me by New Year's Day, asked me 'WHAT?' about 2,400 times by George Washington's Birthday, and mysteriously broke down and resurrected itself by Easter." The home computer, reported the unhappy writer, failed to straighten out the family budget, didn't help educate his kids, couldn't do his tax returns and didn't even assist him in learning how to prepare a program.

Right now all that is changing. Software is catching up, and the home computer is on the verge of becoming as integral a part of the American household in the 1980s as electricity, the telephone or television are today.

The reason? The Source.

The Source is the innovation that will transform every home computer from a technological toy into an essential everyday tool.

The Source is the first nationwide information and service network to be offered to personal computer owners in the United States. By tapping into The Source via telephone lines, home computer owners can receive instant national, international, local, sports and

financial news from United Press International, make airline reservations, buy or sell a home, find out what shows are playing in Los Angeles, learn a foreign language, or chat with others linked up to The Source. This vast data bank, created by Telecomputing Corporation of America (TCA), pools information from more than 2,000 programs. And it's all easily retrievable for even the most non-computer-minded individual.

The cost? Only \$2.75 per hour during off hours and \$15 between 7 a.m. and 6 p.m. weekdays.

"The Source will have as great an impact on society as television, or greater," predicts Marshall Graham, vice president of marketing for TCA. The company is billing The Source as an "information utility" which in the next few years will become as important to consumers as their water, electricity or gas utilities.

"Right now, if you're one of the several thousand people hooked into The Source you can get UPI's stories as they're breaking—as they're being filed to newspapers and television stations," Graham says. "What it means is you don't have to wait until Walter Cronkite summarizes it all at 7 p.m."

Easily retrievable information at low cost is the product TCA wants to sell consumers in 1980. It is a step toward the goal of universal access to information that futurists maintain will dramatically expand human capabilities and options in the next decade.

The Source should help Americans cope with the "information explosion"—the fact that the information in the world doubles every ten years. Complex and rapidly changing living situations make it essential for people to become familiar with the resources and information available to them for dealing with problems and making decisions. This is

true not only for businesses and governments, whose long-range plans depend on elaborate information systems, but also for individuals, who need to learn new techniques for their work, or simply want to explore the alternatives made possible by the increase of leisure time. As Graham puts it, "The ability to function in the future is going to be dependent to a very large extent on the availability of information on an immediate access basis."

In terms of immediate access, TCA's arrangement with UPI, the largest privately owned news gathering service in the world, is perhaps the most intriguing element of The Source. Called NewsShare, it works like this: All information going over UPI international, national, local, sports, feature and financial wires will be sent from UPI's new \$10 million computer center in Dallas to TCA's data collection center in Silver Springs, Md. The subscriber dials a special access number on his telephone (generally a local toll-free number), cradles the receiver in a coupler, punches out a key word on his computer terminal. Within seconds an index appears on the screen—and then the information is only one more code away.

In addition to the UPI wires, NewsShare offers subscribers additional news syndicates, including the New York Times, Chicago Tribune-New York News, the L.A. Times-Washington Post, King Features and United Features. The next step, says UPI executive Travis Hughes, is to hook smaller local newspapers into the system. Such a move would allow a banker in New York to check the financial wires Monday morning before going to work, and also check his hometown newspaper in, say, Bowling Green to see who got married or arrested over the weekend.

"It will be a very individual thing in terms

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of the way people use NewsShare," says Hughes. "I live in Sparta, N.J., but come from Texas and I'm a real Astros fan. I subscribe to both the New York Times and the local paper, but neither carry the outcome of the game because they close too early. So I use NewsShare to call up UPI's sports wire to find out how the Astros did."

Once smaller papers get into the act, Hughes says it is conceivable that a person looking for a '64 Mustang could call up and scan the car classifieds from newspapers around the country. "Classifieds are a natural on this program because most papers have already put their classifieds on computers, just as they have done with editorial material," he says.

Hughes says smaller papers are interested in the concept of NewsShare because it would allow them to distribute local news and ads to an audience away from its own market. Many of these smaller papers have mail subscriptions now, but it is not known how many people, given the opportunity of immediate access to their hometown newspaper, might subscribe. One place where NewsShare seems to be catching on is Capitol Hill, Hughes reports, because politicians see the network as a cheap and easy way to keep tabs on their constituencies miles away.

UPI executives are quick to deny that the home computer will spell the extinction of the newspaper business—at least in the near future. Computers are too bulky to "read" aboard a train or bus enroute to work in the morning. And it is still necessary to know what you're looking for before you sit down at the terminal. Nevertheless, Travis Hughes has already begun to count his profits.

"By 1985, 20 million homes will be equipped with terminals. If each home spends just a dollar a week on NewsShare—the amount of a newspaper subscription—we'll be making one billion dollars a year."

If UPI's NewsShare is the cornerstone of TCA's "information utility," it is only one of hundreds of programs aimed at consumers, businessmen and students.

By special arrangement with some of the leading real estate brokers in the United States, The Source lists real estate nationwide as well as information on financing a new home or figuring out mortgage payments. "Data Automo" is a library that includes reports and road tests for most popular and domestic cars, as well as tips for improving gas mileage, fuel availability and seasonal preparation. "Data Restgo" is a restaurant guide for various metropolitan areas that includes ratings as well as prices. "Data Energy" is a constantly updated library of information on how to cut down home energy use by making homes more energy-efficient.

Other programs and data bases offer the businessman a complete set of packages to perform classic business accounting func-

tions. Another series of programs enables him to keep up to date on the world's major stock exchanges and commodity markets, as well as late-breaking stories that affect them. The Source's "intercomm" system allows subscribers to send and receive mail instantly, reduce paper files and paper generation. For the businessman on the go, The Source has its own travel club that allows the subscriber to make reservations and order tickets without waiting while a reservation clerk assists you over the telephone.

The Source also offers the Dartmouth College Educational Library, thousands of programs oriented toward self-instruction in a wide variety of subjects. Through "Data Educat," students can also find foreign language drills, how to type and information on six federal financial aid programs.

Graham says new programs are constantly being added to The Source and each time the subscriber signs on to the system he will be notified of any new items that have been added since the last time he used the system.

Already plans are being made to enter an

"... The Source will have as great an impact on society as television, or greater. Right now, if you're one of the several thousand people hooked into The Source you can get UPI stories as they're breaking... as they're being filed to newspapers and TV."

encyclopedia into the system, as well as the Bible.

An important key to the success of The Source is ease of operation. As it stands now, The Source is aimed at the person who has very little if any computer experience. To "sign on" the subscriber types out his identification number and a private password. Then, depending on the type of information you're looking for, you type out directions to whichever data base you need. Thus, for UPI news, type "Data UPI." It is essential to know which general data base you want, but that is relatively easy to find in the guidebook that comes with The Source. Once you've decided what data base to use, type a "keyword" such as Carter, OPEC or oil. The computer goes through its index and picks out every story filed over the previous eight days with the word appearing in it.

While the system is much simpler than that

used by most data banks available today, Graham says TCA is researching ways to make it even simpler for the computer klutz who doesn't want to have to sign on or go through the procedure of identifying a data base. For those people, TCA will program a computer to search out automatically the specific items desired and all that's required is the push of a key. If ease of operation is a key to the future success of The Source, so is cost.

There is a \$100 one-time hook-up fee to tap into The Source. After that, the only cost is \$2.75 per hour, billed in one-minute increments, when the system is used during off-hours—weekends, early morning or evenings. The rate jumps to \$15 per hour weekdays between 7 a.m. and 6 p.m. Nevertheless, such rates are amazingly low for computer users who expect to pay between \$30 and \$50 an hour. Customers are billed monthly, with all charges made automatically to a Visa, Master Charge or American Express credit card account. There is also a monthly minimum charge of \$5.

TCA gets away with these low prices because it pays so little for computer time and telephone lines. Early on, the company made a deal with a Silver Spring computer firm to pay a very low price for a large volume of unused computer time—nights and weekends when the computers are not being used. Next TCA approached private data firms that owned nationwide telephone lines and was able to purchase unused telephone time during those same off-hours from a Vienna firm at about 75 cents per hour. The going rate for a WATS line runs about \$20 an hour.

At present The Source has no competition. "We're first and we're out in front," says Graham. But in recent months the General Telephone and Electronics Corporation has obtained a license to market the British Prestel system which uses a modified television set and a keyboard, and Knight Ridder Newspapers Inc. has announced that it will test a similar concept in Miami-area homes next spring. Viewdata is the term given to this group of electronic services that transforms a television into a computer terminal. Like The Source, viewdata will enable subscribers to call up computer files on a variety of topics or send messages—electronic mail. Unlike The Source, information will appear on the television screen as pages rather than specific stories or programs. In Britain, a television set modified for viewdata is said to cost about \$1,200, and information costs an average of 10 cents per page.

Graham says it's too early to tell how a viewdata system in the United States would compete with The Source in terms of price and services offered. What is certain, however, is that competition is not far off. And if all-out competition does for software what it did for hardware, the 1980s will be largely transformed for humans and their computers.



Oracle, Ceefax & Prestel

Progress report on Britain's teletext and viewdata systems, providing instant information on the television screen.

By PAT GLOSSOP

N EWS FLASH from Lima, Peru: A thief snatched a woman's gold-rimmed false teeth while she was yawning during a bus trip.

Gems like this, along with more conventional news and information, are available to British viewers on their own television sets at the touch of a button—thanks to teletext, a revolutionary new way of bringing instant information to the public.

There are currently three systems in operation in Britain: the BBC's Ceefax ("see facts"), Independent Television's Oracle (Optimal Reception of Announcements by Coded Electronics) and the British Post Office's viewdata system, called Prestel.

With Oracle and Ceefax, which recently carried the Lima news flash, all you need is a TV set equipped with a special decoder and a remote control hand-set, about the size of a pocket calculator, to access the information you want. With Prestel, you also need a telephone to connect you with a central computer and complete the viewdata linkup.

Then it's all yours—whether you want to know which record heads the Top 30, your chances of getting the next Freddie Laker Skytrain from London to New York, or the latest move in the Riga International Chess Championship. Getting down to more serious business, you can learn how your stocks and shares are doing, or tune in for news of the latest summit conference. And you can even use teletext as an alarm clock—by setting it to flash at a particular time during regular television programming, it will remind you to make a phone call or take your medication.

Britain has led the world with its new teletext invention. Beginning in 1972, about a dozen British companies, including the Post Office, the BBC and Independent Television (ITV), collaborated on the projects two years ahead of foreign rivals. Electronic enthusiasts joined in the pioneering work, building their own homemade decoders. Following two years of experimental trials by BBC and ITV, and an official go-ahead from the government, teletext became available to the British public in the autumn of 1976. Ceefax and Oracle were born.

The more sophisticated viewdata system, however, has taken longer to make its appearance. Despite a flurry of publicity from the British Post Office, the launch of a na-



Prestel is linked to a telephone, but you don't have to lift the receiver to use it.

tional Prestel service has been repeatedly delayed due to technical problems. As one observer tells it, "It was beginning to seem like Waiting for Godot." But Prestel was finally made available to residents in the London area in March 1979, and on September 11 the system was extended to London businesses.

Ironically, the Post Office recently announced that it is testing Prestel for use by international customers, yet the system has yet to go national. The latest goal (take it with a pinch of salt, according to one English journalist) is that Manchester, Edinburgh and Birmingham will have Prestel computer centers within six months, with 17 other cities following by the end of 1980.

The teletext signal (for Ceefax and Oracle) is a series of digital pulses traveling as part of the normal television picture, using a couple of the space lines on the 625-line European system. On a badly adjusted set, you can sometimes see this signal as a row of flickering dots at the top of the screen.

The information that appears on teletext comes from a variety of sources, including the *Financial Times*, British Airways, *The Guinness Book of Records*, the BBC and ITV news networks, and the international wire

services. The material is fed into each system's own databank by their editorial staff, who use small computers to convert their copy into sequences of pulses which are added to the normal television for simultaneous transmission.

The teletext pages of information—printed in up to seven colors on a black background—are transmitted one after the other, at a rate of four pages per second. It therefore takes 25 seconds to transmit the 100 pages in a teletext "magazine," so any item is available within that time and on average you get a page in 12 seconds.

All the viewer has to do is select the code number for the information required from a printed directory or the index pages on the screen, then punch that number on the control unit. The teletext decoder does the rest: it picks out the pages the viewer has asked for and translates the flickering dots at the top of the screen into words, graphs and diagrams, which can appear on the screen for as long as the viewer wants, thanks to a "hold" button.

The viewdata system (Prestel) works rather differently, since the Post Office uses the regular telephone lines instead of the airwaves to send the signals. When you press the button to summon up a page of viewdata, the

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pulses from the buttons go right back down the line to the computer that is storing the pages. So the number of pages the system can carry is only limited by the storage capacity of the computer, while Ceefax and Oracle are limited by the time it takes to run through a teletext "magazine." The longer it takes, the more impatient the viewer, so teletext seems to work best with a maximum of 100 or 200 pages in a "magazine," while Prestel already has over 180,000 pages stored in its computer.

Although Prestel is linked to the telephone, you don't have to lift the receiver to use the system. You simply switch on the TV set, call up your local Prestel center by pressing a button, then access information using a hand-control as with teletext. But you do pay for the phone call and for the amount of time you're connected to the computer. You may also be charged for the information itself—the price depends on the organization providing it. Ceefax and Oracle, on the other hand, are available free in Britain once you've paid your annual TV license fee (approximately \$50 for a color set or \$26 for black and white) and obtained the teletext equipment.

The Post Office's viewdata system may be more expensive to use, but since Prestel information comes down a telephone line, users can conjure with it 24 hours a day. Ceefax and Oracle, on the other hand, only operate when the three British television networks—BBC-1, BBC-2 and ITV—are on the air, which basically is early morning to midnight.

Telefax, teletext, viewdata—as with any new technology, the invention has spawned a whole vocabulary. Whatever you call it, it sounds marvelous. But is it really so marvelous?

Both Ceefax and Oracle have faced various problems since they began. For a start, since they are transmitted in tandem with regular television, if one of the networks is on strike, its teletext service is automatically killed. Strikes and slowdowns have hit both stations during the past couple of years and, in fact, as this article is being written, an ITV blackout has already blocked Oracle for the past five weeks.

Price is another problem. Sets adapted to Ceefax or Oracle cost an extra \$300-\$500 to buy. Converters designed to adapt an ordinary TV set to teletext go for around \$600—and dealers are quick to point out that they only work on certain new models. With Prestel, prices are even higher, with \$1,200 added to the average price of a 26-inch color television set for viewdata.

Teletext, which was first adapted to the 26-inch sets, is currently being adapted to smaller sets, and this will bring down the cost somewhat. The system works well with 22-inch and 14-inch sets, according to Ceefax's Gwyn Morgan. But obviously there comes a point where it's impractical—with three-inch screens, you'd need X-ray vision.

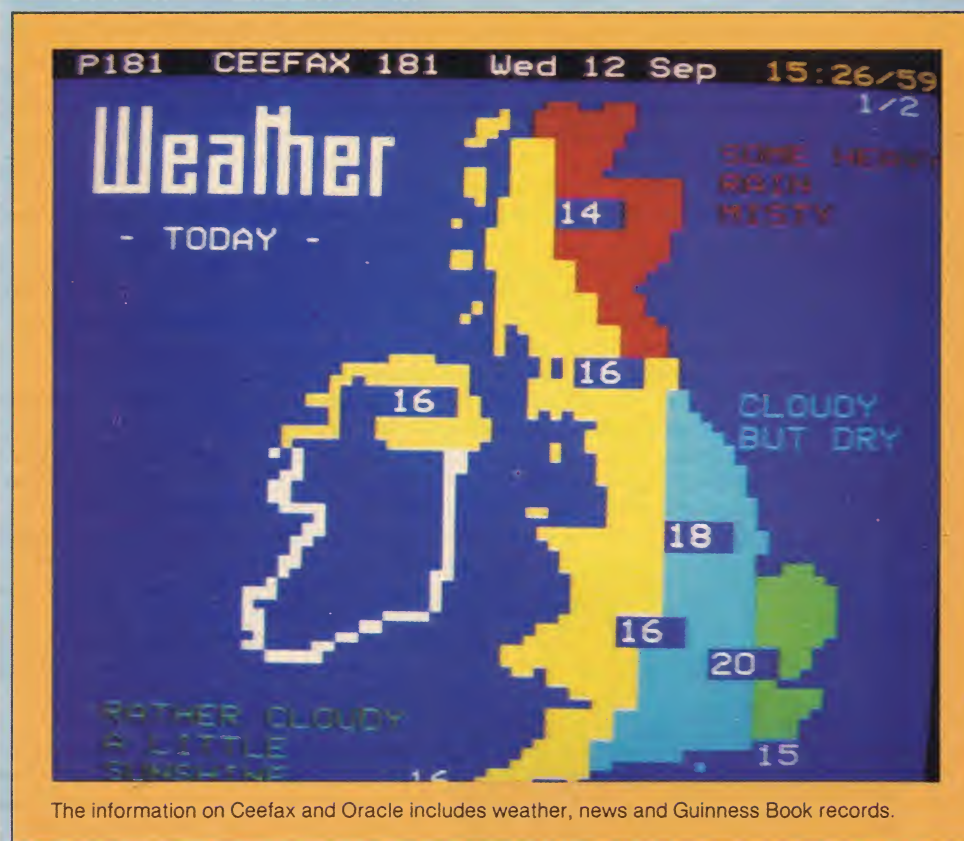
Mass production will help slash prices, but

for the moment it's a chicken-and-egg syndrome: the manufacturers won't increase production until the demand for sets goes up, and the public won't buy the sets until the price comes down.

In the meantime, everyone in Britain's teletext business agrees, this is an up-market product. It's selling to high income customers, mostly men, who watch at least 30 hours of TV a week and tune in to teletext for 20 to 25 minutes a week, mainly in the evenings, according to a market survey by Philips Video Division, one of the manufacturers. The fact

on changing sets he discontinued teletext. "I only tried it because of the stock market prices," he says, "and it didn't seem worth the bother." Yet other teletext users, like accountant Genevieve Taylor, were so pleased with teletext that they graduated to Prestel, which automatically carries Ceefax and Oracle. Some people have even given up daily newspapers, as teletext provides all the information they want—but Fleet Street is still flourishing.

The most popular material on all three systems is the news, finance, sports, weather,



The information on Ceefax and Oracle includes weather, news and Guinness Book records.

is, teletext is expensive and at the moment only the rich can afford to buy it.

Instant information, however, is available to the poorer folks. "Most people in Britain rent their TV sets," says Gwyn Morgan, "and the extra cost per week to rent a teletext set is about 60P, which is the price of a packet of cigarettes." The extra cost to rent a Prestel set is four times as much, in addition to the charge for usage, so the Post Office system is still relatively pricey.

At least the technical side has not proved to be a problem. It appears that any teething troubles were resolved during the experimental stages. "Few of the users have complaints," says George Johnson of ITV's Engineering Department, "and most of those are problems with the set, not with the teletext service."

Occasionally, there's a dissatisfied customer. London actor Lupino Lane, for instance, wasn't happy with his rented set and

and TV and entertainment guides. But each system also aims to meet specialist needs. For instance, the punter (the English term for someone who bets on horses) need never leave home. His TV set can advise that the going is "good to firm" at the Doncaster Racetrack and that the tip for the 1:45 is Billie Jean. He can phone in his bet—Billie Jean or otherwise—to the local bookie, then sit back to watch the results on television a couple of minutes after the race.

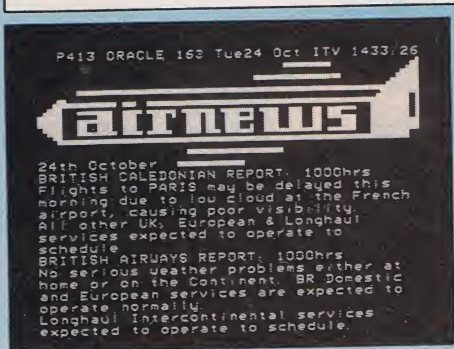
Each teletext data bank is updated as soon as new information becomes available. In the case of Prestel, this is vital. "Users will only pay for information that's worth something to them," says Leonard Kirkham, branch manager with Radio Rentals, the biggest TV rentals concern in Britain. "So the challenge is to the supplier, the information provider, to provide the most up-to-date material so that users buy it."

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Viewdata, however, goes above and beyond its role as a purveyor of data. It also provides a new marketplace for businesses. For instance, real estate agents can advertise their houses on Prestel. Once a house takes your fancy and you want to visit it, Prestel then offers a whole range of information: times of trains to the area, submitted by British Rail, one of 160 information providers; details on the best road routes, according to the Transport and Road Research Laboratory; and finally, if you decide to buy, you can get information on mortgages from the financial wizards.

Though the mainstay of each system is the more serious material, the BBC tailors some data to the occasion. Every day of the Christmas season, Ceefax featured 20 different quizzes and puzzles, five cocktail recipes affectionately called "Aunty Sleighers" ("Aunty" is the British nickname for the BBC), followed by five hangover cures.

Ceefax and Oracle can sometimes provide news updates way ahead of the wire services, thanks to the BBC and ITV national and international news networks. This paid off, literally, for one group of stockbrokers. A local BBC reporter phoned in the news of a break in the petrol drivers' strike, the item appeared on Ceefax three minutes later, and the stockbrokers made a killing before the rest of the market learned the news from the wire services.



Not surprisingly, each teletext system has its followers, be they stockbrokers or salesmen, househunters or housewives, punters or policemen. There's also a young audience tuning in, judging by the fan mail. Children love the fun and games and some of them, like 16-year-old Joanna Jacobs of Oxford, regularly submit teasers for use on teletext.

When you look at the hard figures, things don't look so good. Statistics issued by BREMA (British Radio Electronic Equipment Manufacturers Association) show that only around 26,000 teletext sets (for Ceefax and Oracle) have been sold in the last three years. The Post Office estimates that there are 1,400 users connected to Prestel, though this is the newcomer on the block. But there are almost 56 million people in the United Kingdom and most homes contain a TV set, so

teletext still has a long way to go.

The teletext industry attributes the lack of interest to the high cost of the units and low consumer awareness, despite persistent efforts to educate the public. But interest is growing.

Around 3,000 teletext sets are currently being manufactured each month, and the public is snapping them up. London's Portman Hotel, to give one example of a satisfied customer, has sets in 100 of its 300 rooms. Each day the hotel gets asked not for rooms with a bath, which is taken for granted, but rooms with teletext. Also, some of the information providers themselves are promoting the product—Sealink, the cross-Channel ferry operator, is spending hundreds of thousands of dollars to equip 2,500 travel agents with Prestel sets during the next year.

Meanwhile, teletext technology is moving on apace. Recent developments include a printer developed by BBC engineers that can provide a black and white copy of the material on screen. The printer operates on the output of the receiver's decoder, so it will work for Prestel's viewdata as well as teletext services like Ceefax and Oracle, and for foreign language versions.

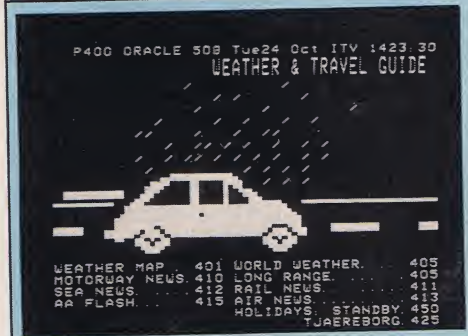
Another breakthrough is teletext subtitling for the deaf, launched by Ceefax last September. This method differs from previous subtitling in that it's optional—deaf viewers can tune in to it, while hearing viewers watch the regular TV picture. For the moment, teletext subtitles can only be added to prerecorded programs. But both the BBC and ITV are currently working to perfect the Instant Palantype/Computer system, based on the Palantype method of court reporting, which will give deaf viewers instant subtitles as someone is speaking.

Experiments are also in progress using teletext in schools, as a backup to educational radio and television. Teletext already has two big advantages in the classroom: pupils can use the pages at their own speed and the pages are there whenever they want to use them. In the future, it has the potential to play an important role in programmed learning, in such areas as testing comprehension, teaching languages and aiding mixed ability teaching.

The British Post Office's Research Centre is currently working on producing viewdata in languages with their own alphabets, such as Arabic, Greek, Hebrew and Katakana (phonetic Japanese). The Post Office has sold its viewdata technology to West Germany, The Netherlands, Hong Kong and the U.S.A., and negotiations are in process with various other countries. The BBC, ITV and the British manufacturers have also demonstrated their teletext technology worldwide, most recently in the U.S. in conjunction with CBS-TV. Trials began at the end of September, when transmissions went out from their KMOX-TV station in St. Louis, Missouri, to locations across the country.

Foreign manufacturers—including, of course, the Japanese—are joining the market, and no doubt the price of teletext equipment will soon begin to drop. But credit for teletext remains with a group of British pioneers who helped trigger a video revolution which will have a major effect on all our lives.

Before long, you will not only be able to summon millions of pages of text through the phone TV link, but also to talk back to the computer sending information, whether it's to book your vacation or order the week's groceries. You'll even be able to pay via viewdata, by feeding your credit card number into the system.



You will be able to send messages to other people via viewdata. Companies, for instance, will be able to put their own information into the computer, which their staff in other locations could access via a private code number.

There's talk of all kinds of Telesoftware, to help you with your tax returns, provide computer games for your kids, and teach you anything from First Aid to Finnish.

As viewdata becomes international, you will have access to information stored on computers throughout the world, again within seconds. As the technology is refined, you will tune in to animated cartoons and full-color photos.

The possibilities are endless.

But there will still be room for teletext. Oracle chief executive Geoffrey Hughes sums up the industry's view: "Viewdata will be the information medium for industry, where the cost of the pages is justified, whereas Oracle and Ceefax will be the home information centers."

"The two systems are really complementary," he adds. "In fact, the Post Office needs teletext, since if a large number of subscribers try to obtain a viewdata page at the same moment, they'll jam the switchboard, just like British soccer fans on a Saturday afternoon."

At any rate, Americans will shortly be able to see for themselves how it all works. Results of the recent teletext trials are being studied by the U.S. Electronics Industry Association and submitted to the Federal Communications Commission, which ultimately will decide what kind of system the U.S. will adopt.

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A Buyers Guide to Home Computers

By PHILIP L. HARRISON and
MARGARET A. TAYLOR

We live in an age of technological miracles. In 1946, ENIAC (for Electronic Integrator And Calculator) was unveiled. This nation's first electronic digital computer, ENIAC ran on 18,000 vacuum tubes, 70,000 resistors, 6,000 switches and 10,000 capacitors. It weighed more than 30 tons, occupied 1,500 square feet of space and consumed 140,000 watts of power. Commercial versions of this machine cost \$5 million. Today, your local computer shop can sell you more capability for under \$1,000 that uses less electricity than a 100-watt bulb and won't even clutter your desk top.

Do you fear being a lone pioneer in a brave, new world? Don't. In 1977, 10,000 Americans owned home computers. United Press International now estimates that there are a half-million such devices presently in use with the market expanding by 10,000 homes *every week!*

Other experts estimate that by 1981 there will be five million private computers in people's homes and available to students. By 1982, 80 percent of upper middle-class homes will welcome computers into the family. Before you clear out a space in the study, there are a few questions you should ask.

What do you buy when you purchase a computer? You buy a solution to a problem or a set of problems. In this respect, a computer is no different from a washing machine or an automobile; they are all solutions to problems. The major difference between a home computer and any other appliance you may have round the house is that everything

Comparative survey of
Radio Shack's TRS 80,
PET, Compucolor II,
Texas Instruments TI-99/4,
Apple II and Apple II Plus

else is designed to handle one specific task—a washing machine washes clothes, an oven cooks, a can opener opens cans, etc. A computer is a multi-purpose appliance that, at least in its initial phases in your home, handles information.

The kinds of information that computers regularly handle are fairly well known. But what you may not know is that there are at least 25,000 uses for these machines that are awaiting discovery. To ask what you can do with a computer is like asking what you can do with electricity.

Your first step in buying a computer is to decide what problems you want one to solve. Once you have answered this question, you will be able to analyze your needs against the abilities of the machines on the market.

Your next step is to visit a computer store. There are over 500 such stores round the country with more popping up every week. Look over their wares carefully, talk with the sales people, examine what they recommend, collect whatever literature is available from the manufacturer...then go home and re-examine everything again.

It should be mentioned that not every computer store will stock all available computer models, so you may have to visit two or three. For example, as a general rule, only Radio Shack stores sell the TRS-80. Some stores, like the Micro Age Computer Stores, tend to specialize in the Apple II. Be aware of what is available locally. Find out about servicing

and about what assistance the store might be able to provide if you hit a snag.

Comparison Shopping

Of the hundreds of units now on the market, we have selected five as points of comparison. They are among the leading sellers in the field (with one exception, a newcomer that bears close watching), but this does not mean that they will suit your particular needs. This comparison is meant as a guide for home computer features and should not be interpreted as a blanket endorsement.

Cost certainly plays a major role in your consideration of a home computer and, with that uppermost in mind, **Radio Shack's TRS-80** is one incredible deal, especially at their recently reduced prices (starting at \$499 for their Level-I unit). Over 100,000 of these machines have been sold since their introduction about two years ago and, with over 7,000 outlets worldwide, servicing and advice should be the least of your worries.

The TRS-80 Model 1 includes a B&W video monitor and cassette recorder and is available with two sizes of memory (4K and 16K) and two levels of BASIC language.

Level-I BASIC is designed primarily to teach computer concepts and is not applicable for serious computer applications. It has only six significant digits and this can be a drawback for anyone who wants a computer for work involving number problems.

Anyone considering a TRS-80 for number "crunching" (numerical problem solving) or for developing sophisticated programs would need the Level-II BASIC, which has 16 significant digits. Level-II also has a faster I/O (see sidebar)—a definite plus for impatient people who will quickly realize that cassette programs seem to take forever.

Another important point to consider in the purchase of this or any other computer is that, statistically, the average computer user generally finds about 16K of RAM memory

Above: Compucolor II is called
The Renaissance Machine.

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satisfies most, if not all, of his computing needs. As such, you will probably be upgrading a smaller memory within a year. This is especially true if your machine starts out as a 4K unit.

A top-of-the-line Level-II (16K) TRS-80 runs \$849. But even if you start out small, rest assured that all machines can be upgraded. An expansion interface for the TRS-80 can increase this machine's capability to rather sophisticated levels, adding either 16 or 32K RAM for a total of 48K! In all practicality, you'd really have to scratch your head to come up with a problem for home application that 48K couldn't handle. The expansion interface is an option (starting at \$299) and is essential if you plan on utilizing any peripherals like printers (for hard copies) or floppy disks.

The TRS-80 is not equipped for both upper and lower case letters, so it is not recommended for such tasks as professional word processing (preparing manuscripts, business letters, etc.). All in all, the TRS-80 is a very popular machine, and justifiably so. There is plenty of documentation accompanying it and loads of software available, both from Radio Shack and other vendors. Besides BASIC, the TRS-80 can also handle FOR-

TRAN, which no other machine covered here can currently handle.

The **Commodore PET** is a very compact computer with keyboard, 9-inch B&W monitor and cassette recorder all in one well-designed package starting at about \$800.

The PET uses a sophisticated full floating-point BASIC language (Assembly is also available) with 10 digits of accuracy. 8K of RAM is standard, but some earlier 4K machines may still be around (be careful of these, however, since most Commodore programs require 8K). The memory is expandable to 32K. The PET offers an array of 64 preprogrammed graphic characters as well as upper and lower case letters.

However, the PET has a calculator-type keyboard that is very difficult to use, both because of the smaller-than-standard key sizes and the lack of spacing between keys. A normal keyboard is available and is really a necessity.

The importance of keyboard "feel" is not to be taken lightly. The keyboard is your main line of communication to the computer and if you find it difficult to work with, you will also find yourself coming up with excuses for not using the computer. Try out the keyboard when you shop.

The PET has a "big" brother, the CBM, which utilizes a more eye-comforting black-and-green monitor and comes standard with 16K RAM, a standard keyboard, but no cassette recorder, for \$995.

It is unfortunate that the company has only a limited amount of documentation and software available to help you get the most out of the machine's capability. If this machine suits your needs, plan on writing a lot of your own programs. This lack of documentation and programs (the company is soliciting programs from PET users) is curious, because the PET is a well thought out piece of engineering that otherwise should do remarkably well in the marketplace.

The **Compucolor II** is billed as "The Renaissance Machine," and it does have some special features that qualify it for that title. Most noticeable is the fact that it comes standard with a 13-inch diagonal color video monitor. However, the real prize is a built-in 5¼-inch floppy disk.

A floppy is a circular piece of flexible material encased in a square plastic envelope which has been coated magnetically in a manner similar to recording tape. Information is recorded or retrieved on these disks and their access time makes cassettes look like a joke. Though they are a great deal more expensive (the actual drive unit can run \$500 or more), they can access seven minutes worth of cassette data in one second or less.

Three models are available. The basic unit (called "Model 3") sells for \$1,395 and comes with 8K of RAM, expandable to 32K. Three different keyboards are available and they all utilize color-coded keys, a nice touch that makes frequently used keys easy to find.

The graphics capability of this machine is its strong selling point. The video monitor reproduces eight colors and 64 special graphic characters are included on the keyboard, making it ideal for people interested in almost any type of graphics work. The colors are brilliant and the machine can create some stunning displays.

Another good selling point for this machine is the standard RS-232C interface suitable for a printer or other peripheral, an option that normally goes for \$100 and up.

The Compucolor II utilizes a floating-point BASIC, but is accurate to only six digits. As in the Level-I TRS-80, this is a detriment to anyone involved in mathematical or scientific work and, unfortunately, it is not expandable. In addition to BASIC, an Assembly language is also available. The machine comes with two sizes of capital letters, but no lower case.

Documentation, again, is the only real drawback of this computer. Though Compucolor has gone to greater lengths than many manufacturers, the unit appears to lack sufficient documentation, ironically, in the area of its strongest selling point: graphics. Additionally, the Compucolor II software

Texas Instruments TI-99/4, available with a speech synthesizer peripheral.



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library appears to be quite small, especially when compared to the TRS-80 and the Apple II.

The introduction of the **Texas Instruments TI-99/4** represents the long-awaited entry of that company into the home computer field. Texas Instruments could very easily swamp the entire industry and the TI-99/4 is a machine with several interesting features.

For starters, the TI-99/4 comes with a 13-inch color monitor with 16-color capability as well as sound (3 tones and 5 octaves). It has a versatile floating-point BASIC language accurate to 13 digits. Data I/O is accomplished by utilizing either one or two cassettes (not included). The internal memory has a non-expandable 16 K of RAM. As such, any programs that you write or obtain from outside sources cannot exceed that capability.

Texas Instruments has chosen to bypass pre-programmed cassettes and floppies (though, supposedly, a drive will be available in the future) in favor of using plug-in ROM cartridges called Solid State Command Modules. These cartridges, which look something like 8-track tapes, supply the TI-99/4 with up to 30K of additional memory, but only for specific programs.

Besides helping to keep the initial cost of the computer down (the entire package, including color monitor, lists for \$1,150), these modules completely eliminate the need to load programs into memory, since they are memory.

This "Command Module" feature, not unique to the TI-99/4 by the way, is an inexpensive way to create a large memory, since RAM is more expensive than ROM. But remember that the additional memory in these cartridges can only be used for one specific purpose and cannot be utilized for any other. This means that you can't program it and you can't store anything on it and you can't modify it. For that you need a cassette or floppy.

At present, TI has a small start on a module



Radio Shack's TRS-80, the only machine covered here that can handle FORTRAN.

library, but a great deal more of them will be needed if the versatility of this system is to be realized.

Another interesting feature of the TI-99/4 is the built-in equation calculator, directly accessible from the keyboard, for quick solutions to mathematical problems.

Among peripherals currently available is a speech synthesizer, capable of an impressive 200 words... with future foreign language capability. An RS-232C interface is also available for outside vendor peripherals, but check on software availability so that your TI knows what to do with it.

The Apple was one of the first true home computers on the market and its current

manifestations, the **Apple II** and **Apple II Plus**, make it the most versatile of the computers described.

The Apple II is capable of graphics in 15 colors and comes with an audio cassette interface (but no cassette), a game I/O connector, two game controls, and a speaker for sound and speech capability (capable of 12 tones and 5 octaves). It does not come with its own monitor but can be plugged into any color TV through an optional RF modulator (\$30).

The standard Apple II comes with 16K RAM (expandable to 48K) of Integer BASIC (a fast language designed for games and high-speed graphics). The Apple II Plus differs primarily in the use of floating-point BASIC; with nine digits of accuracy. Both units sell for the same price, starting at \$1,195.

Where other computers are marketed with specific concepts in mind (the TI-99/4 and Compucolor II are good examples of this), the Apple specializes by not specializing at all. If you're looking for a machine that's capable of darn near anything... this is it.

There are more peripherals available for the Apple II, and more programs being written for it than any other computer of its type (with the possible exception of the TRS-80). Programs currently on the market run from the simple, like balancing your checkbook, to the sublime, like diagnosing bone tumors.

Programming sophistication and data I/O will be aided by the fact that, in addition to BASIC, the Apple II is the only home computer on the market that can be programmed for PASCAL. This powerful language is the up and coming thing and has been adopted by

Computerese Glossary, Ltd.

The vaguely intelligible terms that float around the room whenever computers are mentioned are the result of engineering shorthand created during computer development. Some of the more common words used in this context, and their definitions, are:

RAM: An acronym meaning "Random Access Memory." This is the main memory of any computer. Information of virtually any type can be stored in RAM, retrieved and changed. In most computers, however, whatever is in RAM is lost when power is turned off.

ROM: Another acronym for another type of memory, "Read-Only Memory." Information placed into ROM is permanent and can usually be placed into a

machine only by the manufacturer. It cannot be added to or modified, nor is the information lost when power is turned off.

I/O: An abbreviation for Input/Output. A keyboard is an input device, printers and video screens are output devices.

BIT: Meaning BInary digiT (a one or a zero). The smallest amount of information that can be known.

Byte: A computer "word." Composed of varying numbers of bits, depending on the manufacturer.

Peripheral: A device that can send information to and/or from a computer. TV monitors, printers, recorders and floppy disks are peripherals.

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Commodore PET: A compact computer in one well-designed package.



Apple II can be plugged into any color TV for color graphics.

the Department of Defense as this country's standard language for new program development in the government.

The majority of interfaces for the Apple II peripherals are intelligent (a claim also made by PET); that is, the software needed to run the peripheral is included as a ROM chip within the interface itself. This eliminates the need to take up internal memory space with additional programs. These interfaces, as well as any memory expansions, do not require factory servicing. You merely open the Apple II and plug them in.

There are eight expansion slots available internally for peripherals at no extra charge.

In addition to BASIC and PASCAL, an Assembly language is also available. Unfortunately, this computer does not come with lower case letters.

Documentation on the Apple II is excellent and can be looked upon as a standard of the kind of material that should be supplied with any machine. A testimonial to the confidence that rides with this machine is the blunt fact that it is the only micro-computer with a one-year warranty (virtually everyone else has a 90-day warranty). The Apple II also has an extraordinarily high trade-in value on the retail level.

If there is any major disadvantage to the

Apple II it is in that self-same versatility that makes it so appealing. When you take into account the need for a TV monitor and cassette or floppy, it becomes the most expensive machine of the five discussed (although not by much). If your needs are more specific rather than general, another machine may better suit your purposes... at a lower cost.

Making Up Your Mind

These units are all good examples of the incredible capability that is currently on the market. But the home computer field is expanding so rapidly that it is doubtful that anything will remain the same a mere five years from now. Future advances in "computer on a chip" technology will be astonishing when you realize that the lowly amoeba is a far smaller and far more powerful information processor than today's best chip.

Where does this put you? Might you be better off waiting to purchase your computer until yet another breakthrough appears? If that's what's troubling you, the answer is no.

The average American spends between \$5,000 and \$10,000 on an automobile and usually thinks nothing of trading it in every three years (and this doesn't include the horrendous cost of gasoline and repairs). We put up with it because the car, a mechanical extension of the horse, is a symbol of physical freedom.

If the automobile frees our bodies from confinement, so too does the computer free our minds. In a world where choices are becoming increasingly complex and important and where new alternatives are desperately sought, that can be an awesome freedom indeed.

There is a computer in your future... and you can have the future now!

Grokking Your Computer

Computers are binary devices and, as such, understand only two commands which can be represented as either yes and no, black and white, on and off, or 1 and 0. As such, they are infinitely literal "minded" and there is no room for the ambiguous gray areas that occupy most human communication.

Computer languages translate normal human thought into a computer's binary mode. Though it has been demonstrated that any logical problem which can be solved in one language can be solved in another, it is the ease with which that solution can be obtained that accounts for the variety of languages.

Some of the more popular languages and their uses are:

BASIC: Beginners All-purpose Symbolic Instruction Code. It's just what it says it is, a relatively easy-to-learn language designed for general problem solving.

COBOL: COmmon Business Oriented Language. Designed primarily for business applications requiring a lot of I/O and data storing with a minimum of mathematical computation.

FORTRAN: FORmula TRANslation. A scientifically oriented language for number "crunching" or problems requiring lots of mathematical calculations.

PASCAL: Named after the Frenchman, Blaise Pascal, who, among other things, developed the first digital calculating machine in 1642. This is a powerful, relatively new, sophisticated language which, because of its structured nature, shortens programming and program modification time.

ASSEMBLY: A humanized version of the computer's own binary language. It requires that the user provide detailed step-by-step instructions. While providing flexible and compact programs, it does consume a great deal of programmer time.

Tellico: The Anatomy of an Ecological Disaster

September 26, 1979, will go down as Black Tuesday in the history of the Ecology Movement. For on that day President Jimmy Carter signed legislation permitting the completion of the infamous Tellico dam in Tennessee, a controversial project held up for the past five years because of its interference with an endangered fish. With the stroke of a pen Carter did more than close the floodgates of Tellico; the way is now clear for an assault on environmental legislation that had only just begun to curb decades of past abuse. Through the art of pork barrel politics and legislative sleight of hand, the completion of a worthless, needless dam has spelled disaster for and made a mockery of immeasurable efforts to preserve the nation's resources.

The history of the Tellico dam is a long and sordid one. Most recently it has been associated with the endangered snail darter, a three-inch member of the perch family that halted work on the \$115 million dam when it was discovered that flooding the Little Tennessee River would destroy the sole habitat of the fish. This is in violation of the U.S. Endangered Species Act, which prohibits funding of federal projects which interfere with the survival of a species threatened with extinction.

However, Tellico's past involves much more than the snail darter. It was back in 1936 that Tellico was first envisioned as one of 70 Tennessee Valley Authority projects; the mere fact that it has taken 43 years to get this far is itself pretty incredible (and it is the *last* of the 70 projects). Not until 1966 did work finally commence on the dam, and even then opposition—based on environmental and economic objections—was mounting.

During the ensuing eight years, millions of dollars were spent in procuring land and building dikes, roads and other additions to the area. And all the time, local citizens' groups were waging battle to block the project, claiming that it simply was not worth the time, effort or money—to say nothing of the environmental havoc it would wreak.

Their champion, as it turned out, was the snail darter, which was placed on the Endangered Species list in 1976, after which a suit was filed to stop construction. The final test—or so it seemed at the time—came when the U.S. Supreme Court ruled that the Endangered Species Act must be upheld, and the dam was suddenly stricken with white elephantitis.

Tennessee politicians—led by the Senate's powerful minority leader (and Presidential hopeful) Howard Baker—immediately initiated efforts to have Tellico exempted from the Act. Subsequently, the Act was amended,



Tennessee's Tellico Dam: An ecological disaster sanctioned by the Carter team.

creating an Exemption Committee (quickly dubbed the "God Committee") to review such "unresolvable" cases. The committee's first action was a unanimous vote against exemption for Tellico—on the basis of economics, not the snail darter. Still not satisfied, Baker and company attempted to overrule the decision of the very committee they fought to establish, a maneuver shot down in the Senate. That was last June.

On July 18, Tennessee Representative John Duncan introduced an amendment to an energy and water projects appropriations bill that would exempt Tellico not only from the Act but from *all* federal regulations. The rider was unprinted, unread, undescribed, undebated and passed in 43 seconds with only 15 House members (out of 435) present. The names Tellico and snail darter were never even uttered.

The amendment bounced back and forth between the House and Senate. The Senate refused to accept the rider. The full House approved it. Finally, the Senate, following unsuccessful conference debates with the House, relinquished. The appropriations bill containing the Tellico amendment was sent to the White House for approval.

The environmental community then put together a vigorous front to persuade President Carter to veto the bill, again, not in the name of the snail darter, but rather on the basis that the dam is an extravagant boondoggle. A veto was also strongly favored by Interior Secretary Cecil Andrus and Gus Speth, chairman of the President's Council on Environmental Quality. The General Ac-

counting Office and Charles Schultze, head of the Council of Economic Advisers, likewise determined that Tellico was a wasteful, expensive and unnecessary project.

Within 12 hours of the Carter decision, the bulldozers started rolling along the banks of the Little Tennessee. It's likely that no challenge will stop Tellico, which is now waived from *all* federal laws and regulations.

What exactly does the completion of Tellico mean?

At least an additional \$40 million is needed to safely complete the dam. According to TVA, some 23,000 acres of rich farmland will be underwater, cutting out at least \$50 million in annual production value, just to produce \$3 million worth of electricity. Oddly enough, the Tellico dam—often referred to as a power project—has no power generators; some of its waters are to be diverted to a nearby hydroelectric dam. The main purpose of Tellico is to create a recreational lakefront. For this, not only will the snail darter be wiped out; the floodwaters will destroy priceless historic Cherokee Indian archeological sites, displace at least 340 farm families and tame the last free-flowing river in the state.

In his energy address to the nation last summer, President Carter declared that he would "protect the environment" but that energy projects would not be stalled by environmental laws and regulations. He appears to be living up to his words this time. He has now set a dangerous precedent, leaving the way clear for riding roughshod over environmental legislation. Congress has also paved the way for detouring pet projects around legislative roadblocks. At the same time, legislation is being prepared to create an energy mobilization board to hasten energy production; such a system would trample its way through existing conservation statutes.

Following Carter's actions on that fateful Tuesday in September, the League of Conservation Voters, one of the President's firm allies, withdrew their support, citing his acquiescence to special interests. "The President chose to give up the fight before it even began," they say.

On the other hand, it is that same fighting spirit that has led conservationists to strive so diligently to protect not only the snail darter, but so many other environmental issues as well. A statement by David Brower of Friends of the Earth sums up the situation: "All our victories are temporary, all our defeats permanent."

The Tellico dam will stand as a monument to the gluttony of politics. Hopefully, too, it will emerge as a rallying point for the environmental battles that are certain to follow in the days ahead.

Television '80: A Vintage Year For Futurism?

If the 1970s proved anything to television programmers, it was the fact that speculative fact and fiction is a very unsure commodity when it comes to garnering respectable Nielsen ratings. Big budgeted science fiction epics like *Battlestar Galactica* and *Logan's Run* sank like sea-faring Cylons after a few airings and network-produced science shows hosted by such well-known personalities as Walter Cronkite and Ray Bradbury went virtually unnoticed by the viewing public.

As a result, the 1980s are getting off to something less than a spectacular start in the area of science fact and fiction, with PBS offering the most promising productions for the coming 12 months. Among the more thought-provoking presentations in the offing are:

Cosmos: Scheduled for airing in the fall of 1980 is the Public Broadcasting Service's innovative science series, *Cosmos*. Hosted by Pulitzer Prize winner Dr. Carl Sagan, the 13-part production will take television audiences on spectacular voyages through space and time to explore what Sagan refers to as "the deepest connections of human beings with a vast and awesome universe in which we float like a grain of sand in the cosmic ocean."

Through the lavish use of special effects and filming at more than 40 locations around the world, *Cosmos* will investigate the planets, black holes, the origin of matter, the human brain, alternate universes, time travel, communication among the whales, the death of the sun and life on other worlds. In addition, the show will focus its attention on Hindu cosmology, cosmic catastrophes, the flight of Voyager, cosmic influences on the evolution of life, the collisions of continents, sailing ship voyages of exploration, the deciphering of Egyptian hieroglyphics, the origin of life, contact with other civilizations in space, the birth and death of stars and galaxies, the future of the Earth and the deepest questions concerning the origin and fate of the universe.

All of these episodic learning excursions will take place through the use of a fictitious spaceship helmed by Dr. Sagan. Each week the vessel will hurtle, via the Cosmic Zoom, into different areas of exploration. The scientific aspects of the show, although intellectual in nature, will be handled on a totally entertaining level. Sagan believes that science and the masses are made for each other and *Cosmos* is the show to prove it. "Science can be presented in an entirely comprehensible and exciting way to general audiences while maintaining high standards of scientific ac-

curacy. We are, after all, a scientific species," he says.

A joint project of Carl Sagan Productions and KCET, Los Angeles, *Cosmos* is being made possible by grants from Atlantic Richfield Company, the Corporation for Public Broadcasting, and The Arthur Vining Davis Foundations. The British Broadcasting Corporation and West Germany's Polytel International are co-producers.

Films-for-TV: PBS will air Ursula Le Guin's *Lathe of Heaven* this January as previously announced in FUTURE LIFE # 15. The show, which stars Bruce Davison and Kevin Conway, will serve as the pilot episode for a proposed series of speculative fiction geared towards PBS's 1981 season. Meanwhile, over at the networks, NBC-TV is still promising both *Brave New World* and *The Martian Chronicles* for the new year. *Brave New World*, which has been bumped twice during the last 12 months, is tentatively scheduled for February with one hour of its original four trimmed for airing. Designed as a two-part, two-hour mini-series, the film is currently being touted as a three-hour telefilm to be shown on one evening. On a happier note, the three-part, six-hour *Chronicles* is finally finished with its last minute surgery. Slated for a September 1979 premiere, the mini-series was originally intended to open NBC's new season with flair. A badly constructed first installment, however, led the producers and network to a last minute yanking of the series and an eleventh hour re-editing job. The show, written by Richard Matheson and based on Ray Bradbury's novel, stars Rock Hudson, Roddy McDowall, Darren McGavin and Maria Schell.

Medical Science and the Nation's Health: The New York based Telepicture Corporation has reached an agreement with the University of California Extension, San Diego, to co-produce and distribute a medical series for the Public Broadcasting Service. The series, at this point called *Medical Science and the Nation's Health*, is projected as four to six hour-long episodes examining medical care and research in today's and tomorrow's society. To be filmed late in 1980 with a spring 1981 airdate, the show will be linked to a 15-part newspaper series developed by Courses by Newspaper of the University of California.

Nova: PBS's prize-winning series continues to offer provocative insights into the scientific community this season with an eclectic array of topics. December 11's episode, "Termites and Telescopes," is a tribute to the late Jacob Bronowski, author

of *The Ascent of Man*. In the second of a series of annual memorial lectures, Dr. Philip Morrison, Institute Professor and Professor of Physics at MIT, points out, often humorously, the differences between how humans and termites approach problems vital to survival of each species. December 18 offers "Blindness: Five Points of View," a collection of intriguing case histories spotlighted in FUTURE LIFE #10. January 8's show, "Living Machine," examines the most complicated machines in existence... the living, breathing bodies which populate planet Earth. "Hepatitis" is the tentative title for January 15's presentation, a medically-oriented show tracing the past 15 years of progress in the fight against this often deadly disease. January 22's episode delves into the life of the legendary "Father of the H-Bomb," Dr. Edward Teller. Entitled "A Is For Atom, B Is For Bomb," the show chronicles Teller's controversial and headline-dotted scientific career.

The Tomorrow Man: A Canadian production, this futuristic suspense tale is the first episode of a proposed speculative fiction series, *Through the Eyes of Tomorrow*. Currently up for grabs for stateside airing, *The Tomorrow Man* takes place sometime in the near future in North America. Tom Weston (Stephen Markle) wakes up one morning and finds himself in one of the future's many maximum security prisons. He is declared a political prisoner of the New Regime and is held without knowing why he is there. For ten years he survives the taunts of the enigmatic Warden (Don Francks) and the abuse heaped upon him by the automated guards. Finally he escapes, makes it to the top of the prison wall and... then the cosmic fun begins.

Conceived by Stephen Zoller and Tibor Takacs, *The Tomorrow Man* is, hopefully, a sign of better times for SF on TV. Says Takacs: "With *Through the Eyes of Tomorrow*, we're trying to recapture the magic and intelligence of the Rod Serling teleplays of the 1950s, but updated into a more cinematic style and respecting the attitudes of today's audience. I think people are tired of the transplanted western kind of 'sci-fi' programs... they're ready for high quality speculative fiction."

Zoller agrees, adding, "It is our intention to do for television what Ellison, Heinlein, Asimov and Clarke did for what was once called 'pulp' fiction. They have created a new genre... speculative fiction. We intend to carry this over to television. We are determined, in the words of Ray Bradbury, to make 'speculative fiction the dramatic form of our time.' "




In *The Lathe of Heaven*, a tale of the future to be shown on PBS, Bruce Davison is George, a fellow who can change the world via dreams. Above: The dreamer returns to his recently renovated home . . . a literal dreamhouse.



Left: A chilling scene from the recently completed pilot film, *The Tomorrow Man*. A Canadian excursion into speculative fiction, it combines elements of the old *Twilight Zone* with the claustrophobic feel of *The Prisoner*. Here, Tom Weston is caught by robot guards.

THE BLACK HOLE





Walt Disney Studios takes the biggest risk in their history, unveiling a \$20 million voyage into one of modern science's most profound mysteries . . . a black hole in space.

By DAVID HOUSTON and ED NAHA

"I suppose you *could* call this a big risk on our part," says Ron Miller from his office in the Burbank, California, Walt Disney Studios complex. "But we like to think of it as an ambitious experiment." Silence. "Alright," he laughs. "A *risky* ambitious experiment."

Miller, executive vice president in charge of production and creative affairs at the Disney complex, is speaking of *The Black Hole*, Disney's biggest movie to date, both in terms of budget and scope. The science fiction adventure cost the studio some \$20 million and the graphic realization of a black hole in space required the Disney crew to invest nearly 14 months of simultaneous and post-production filming and processing. Directed by Gary (Washington: *Behind Closed Doors*) Nelson and featuring some of the most phenomenal space effects ever concocted for the screen, *The Black Hole* is a very bold cinematic venture on the part of the family-oriented Disney crew; a movie geared to win back the more sophisticated moviegoers that have fallen away from the Disney trade.

"With *The Black Hole*," says Miller, "we're trying to attract a slightly older audience. The audience we used to have a few years ago. Lately, a lot of teenagers and young adults have stayed away from Disney films. They feel embarrassed to be there. They consider it kiddie material. Well, *The Black Hole* is not a kiddie film. It's a science fiction adventure on a grand scale. It stands on its own, with or without the Disney logo. We want to let people know that this is a different kind of movie than they're used to seeing from us."

To help insure the film's independent status, producer Miller and the creative studio crew signed up a roster of very un-Disneysque actors (Anthony Perkins, Yvette Mimieux, Maximilian Schell, Ernest Borgnine) and enticed such legendary special effects figures as Art Cruickshank (Oscar winner for *Fantastic Voyage*), Eustace Lycette (Oscar winner for *Bedknobs and Broomsticks*), Peter Ellenshaw (Oscar winner for *Mary Poppins*), Danny Lee (Oscar winner for *Bedknobs and Broomsticks*) and Harrison Ellenshaw (best known for his fantastic *Star Wars* matte effects) to make the production as spectacularly spacey as possible.

Briefly, *The Black Hole* recounts the adventures of the crew of the explorer ship *Palomino* on a voyage through deep space.

Left: *The Cygnus* soars through space.

PHOTO © 1979 WALT DISNEY PRODUCTIONS

Dr. Alex Durant (Anthony Perkins), an astrophysicist; Dr. Kate McCrae (Yvette Mimieux), an astro-geophysicist; Harry Booth (Ernest Borgnine), a journalist; Captain Dan Holland (Robert Forster) and his first mate (Joseph Bottoms) stumble across a derelict spacecraft, *The Cygnus*, a vessel assumed lost for 20 years. *The Cygnus*, however, is far from dormant. On board, Dr. Hans Reinhardt (Maximilian Schell), an eccentric scientist, walks the thin line between genius and insanity on a moment-to-moment basis.

Ruling a horde of robots led by automaton Max, Reinhardt has moored his spacecraft on the edge of a massive black hole. The joy of discovery experienced by the *Palomino's* crew is dampened, somewhat, when they realize that Reinhardt plans to keep them aboard as prisoners while he slowly guides *The Cygnus* into the heart of the nearby black hole. Frantically, they attempt an escape, with only a few making it into a lifeboat probe vessel. *The Cygnus* begins to break apart under the powerful pull of the collapsed star and the unlucky survivors find themselves sucked into its center for a mind-boggling finale that promises to be one of the most astounding arrays of special effects ever lensed.

If *The Black Hole* sounds like a startling departure from the G-rated comedy-adventures usually associated with the Disney Studios, rest assured that it is... a departure that was a long time in coming. Originally conceived as *Space Probe*, the epic film was the brainchild of veteran Disney producer Winston Hibler, who came up with the idea in 1974. Hibler was fascinated by the cinematic possibilities of the mysterious scientific wonders known as black holes, and he saw the project as the perfect vehicle to guide the studio back into its adventurous spirit of two decades ago, exemplified by such films as *20,000 Leagues Under the Sea* and *The Swiss Family Robinson*.

In a blatant effort to recreate the scope of those movie milestones, Hibler lured matte artist extraordinaire Peter Ellenshaw out of



Unspeaking humanoids conduct a macabre funeral ritual in deep space in *The Black Hole*.

retirement and asked him to do some conceptual paintings for the proposed film. Ellenshaw, the man responsible for much of the magic in the classic Disney adventures, agreed.

Then Hibler died suddenly in 1975. Ron Miller took over the project at this point. Miller, a veteran producer of both the network TV show and numerous Disney theatrical releases, pushed the project through various committees, gathering more and more creative personnel as he went along. Input from ad chief Martin Rabinovitch saw the film's title change to *The Black Hole*; a name picked from over 500 possible titles.

Pre-production work slowly began to start. Art director John Mansbridge was asked to design the out-of-this-world sets. A new, half-million-dollar camera system, ACES (Automated Camera Effects System) developed by Cruickshank, Lycette, Don

Iwerks, David Snyder and David English was employed; a computer-controlled system which allowed seemingly impossible effects shots to be accomplished.

George McGinnis of WED Enterprises, a Disney subsidiary, was given the task of designing the non-human characters in the film—including robots Maximilian, the nuts and bolt villain; Old Bob, the heroic but outdated pal of the *Palomino* crew and V.I.N.CENT, the all-knowing Vital Information Necessary Centralized computer robot.

At this point, Miller approached director Gary Nelson with the movie. Nelson, a well-known TV director who had helmed Disney's 1976 comedy, *Freaky Friday*, initially turned thumbs down on the overwhelming project. "In December of 1977," he recalls, "the Disney people brought me 40 pages of space-



Ernest Borgnine, Tony Perkins, Yvette Mimieux and Robert Forster gaze into the swirling heart of a black hole from the *Cygnus* bridge.

ALL PHOTOS © 1979 WALT DISNEY PRODUCTIONS

adventure script and asked me to direct. I read it and turned it down.

"The producers then contacted me and asked me to come to the studio and look at Peter Ellenshaw's pre-production renderings and some of the models, which were already under construction (the models, by Danny Lee and his crew, are intricate constructs, ranging in size from roughly a foot and a half to eight feet). This happened during a time I was making a TV film and I could only come in on a Saturday. I showed up and the place was deserted. They showed me the renderings. I *knew*. I said 'This is something I want to be involved with.'"

The script, at that point, was a big problem and Nelson wasn't the only involved party to think so. The movie was alternately announced and put on hold by the studio during this time of development. "There was a good idea there," Nelson recounts, "but I knew it could be improved. I immediately started working on the script. I believe, although we'll never know for sure, that we now have a much better picture than we started out with. Jeb Rosebrook took my ideas and incorporated them into the script. Gerry Day took over and she really put it all together."

The final screen credit reflects the constant reworking of the plot, reading: "Screenplay by Jeb Rosebrook and Gerry Day from a story by Jeb Rosebrook, Bob Barbash and Richard Landau."

With a production schedule overtaking the revision of the script, casting had to be started before the shooting script was actually completed. "We couldn't cast the whole movie at that point," recalls the director, "because there was always the chance that the roles would change. In fact, two of the original characters disappeared from our final draft. At one time, we featured two women. We dropped the nonfunctional one and the couple of good character traits she had were added to the role portrayed by Yvette Mimieux."

The director and producer of the film sought out actors and actresses known, primarily, as international stars and not Disney veterans. As a result, the casting presented some unusual problems. "There was one character, Dr. Reinhart. . . . Maximilian Schell was our first and only choice for the role," says Nelson.

"Schell liked the part and agreed to the money we were offering, but he stipulated that he had to meet the director, me, face to face, before signing. He thought we should get to know each other first." (Schell admits to this idiosyncratic act, stating, "I could tell of his sincerity that way.")

"He was in Vienna directing a picture, *Tales of the Vienna Woods*, and I couldn't leave here. A month later, someone said, 'You know, we still don't have Max Schell signed.' So I called him again and suggested that we meet halfway. He said, 'My friend, halfway is in the middle of the Atlantic Ocean.'"

"I had no choice. I hopped a plane to Vienna, had dinner with him and flew back the next day. He was this wild man, very theatrical with a scarf around his neck. It wasn't any sort of interview, really, just a little light spar-

ring to see if we could understand each other. One thing happened that, I guess, it's safe to assume had something to do with his joining us. During dinner he asked me if I'd seen Jason Robards in *Washington: Behind Closed Doors*. He thought it was an excellent series and that Robard's performance, in particular, was wonderful. He also thought Robards would be perfect for the role I was offering him. I said, 'Yes, I've seen it. I directed it.' That seemed to impress him more than anything else."

Casting nearly completed, there was a full year of pre-production work to accomplish before cameras could roll in October of 1978. With the script polished, storyboard artists took it and, with instructions from Nelson and Ellenshaw, spent several weeks mapping out every single shot in the picture. They were allowed to let their imaginations run wild.

"I really had no guidelines for a picture of this kind," smiles the director. "I believed that anything I could imagine, or Peter could imagine, could be done on film by the Disney special effects studios. And, because of my ignorance, I didn't have the chance to back off. I hope that, as a result, we did many shots and sequences that previously have been considered impossible or too costly." (For the

Yvette Mimieux: "This science fiction movie isn't aimed at kids. It's for everyone and has technological magic that no one has ever dreamed of before."

record, there are over 150 matte shots in *The Black Hole*, with one scene involving over 12 composites.)

"For instance," Nelson continues, "there are very few static shots in the picture. We moved the camera constantly, on matte shots, on blue-screen shots, black velvet shots. The camera stops only when it must. Effects people kept telling me that we ought to shoot a risky scene several ways, in case the way we wanted it didn't come off. I'd say 'We're going to shoot it only one way and find a way to make it work.'"

"Needless to say, it pleased everyone to learn that new things could be done without causing the picture to go \$10 million over budget." (The budget did climb a bit from the originally touted \$17.5 million figure to the finished \$20 million price tag. Even at its original cost, the movie was the most expensive in Disney history.)

With the visual effects in the making, the director now had to face the film's human element. For a cast of actors not at all accustomed to working within the confines of a massive effects film, *The Black Hole* proved a challenging set indeed. "In a science fiction movie the production designer is more important than the actors," says Yvette Mimieux, who started her acting career in *The Time*

Machine. "So, working in a film like *The Black Hole* was infinitely more difficult for the actors. The characters were not as fully revealed as they would be in a small, intense drama. We had to fill out all the details of the roles ourselves."

Co-star Ernest Borgnine agrees, adding, "Every sound stage on the Disney lot was used for this production and it was all shot indoors. Extensive lighting jobs take time. Special effects take time. Sometimes it was rough just to sit around there waiting."

To pass the time, the actors came up with a few novel ideas to break the boredom of deep Hollywood space. Borgnine, for instance, pulled off what was probably the finest piece of prank work ever witnessed on a set in or out of this solar system. During a dramatic scene wherein stars Mimieux and Perkins were called upon to peer out of a porthole and reflect on the vastness of the black hole, Borgnine waited until the dialogue reached its climax to pop up and peer inside the ship from outside the porthole, his famous gap-toothed grin firmly affixed on his face. The scene ended in gales of laughter and there was little or no tension to be found aboard *The Cygnus* set for the rest of that day.

Mimieux, no slouch in the boredom-breaking biz, took it upon herself to smuggle champagne into the Disney commissary every day in order to add some sparkle to the spacey happenings. Everything went well for several weeks, with the champagne going unnoticed by the no-nonsense security crew. "Then," recalls Mimieux, "one day the cork exploded with a terrific bang and caromed off a window. It hit this lady who began screaming bloody murder. After that, I was asked never to bring champagne into the studio again."

When not fighting ennui, the actors were called upon to participate in quite a few hair-raising scenes caused, for the most part, by the impending collision between *The Cygnus* and the black hole. "We spent days filming one scene requiring a state of weightlessness," says Mimieux. "There were sets falling apart on us and vacuums created that threatened to suck us away and enough equipment to climb over that we might as well have been climbing mountains."

In another scene, the actress had to have her hair, wardrobe, hands and face frosted. "It's a scene where the temperature drops very quickly. The makeup looks great on film, but when we all went to lunch, passersby gazed at us in horror. We looked terribly ill."

Despite the rigors of production, Mimieux is quite proud of the finished film. "This science fiction movie isn't aimed at kids," she says. "It's for everyone and has technological magic that no one has ever dreamed of before. That's why no reporter was allowed on the set while we were filming. The Disney people were afraid of someone stealing their ideas."

Even veteran actor Tony Perkins was impressed with the mammoth space adventure, although annoyed by its secrecy. "It's on a super epic scale," he concedes. "There is every mechanical gizmo imaginable in it, sort of a *Captain Nemo in Space* thing. It was a

(continued on page 63)

Past Glories and A Choice of Futures

Mercury According to Wolfe

When NASA introduced the seven Mercury astronauts to the world in 1959, the intrepid flyers were greeted like the cavalry coming over the hill in the last reel of a wide-screen western. The press took one look at them and declared that these clean-living young heroes were here to save the day. It was enough to give every American a lump in the throat.



These were the Cold War's frostiest days. Sputnik had just struck terror into the national heart by beating the U.S. to the newest combat zone's high ground and we had yet to get one of our rockets off the pad without it blowing up.

This magnificent seven would be our first warriors in what the stately *New York Times* called a "Race for Survival." In fact, the astronauts' courage was so well-publicized that almost everyone forgot that they hadn't done anything yet.

If the press and the public were overlooking the obvious, they did understand one thing—these guys had **The Right Stuff**, and that is the title of Tom Wolfe's newest book (\$12.95 in hardback from Farrar, Strauss & Giroux). Wolfe traces the real story of the people, pilots and, of course, the right stuff in an iconoclastic history of the earliest days of the American space effort.

The right stuff is the "...ability to go up on a piece of hurtling machinery and put your hide on the line and have the moxie, the reflexes, the experience and the coolness to pull it back at the last yawning moment." But the first astronauts were confronted with a problem—the white-coated doctors and the NASA engineers thought the astronauts were "redundant components" in the Mercury capsule's fully-automated system, nothing more than lab specimens to be shoved in the capsule, blasted off the planet and then fished out of the water at the end of their missions. And worse than that, the astronauts' peers, the other test pilots who were flying the X-15 into space, figured that anyone flying the same missions as monkeys (the earliest test flights were manned by monkeys) knew nothing about the right stuff.

This was too much for the seven and they rebelled. They demanded that the capsule be called a spacecraft, that the engineers install a

window (a pilot has to see where he's going) and that they be given a control stick and the option of flying the spacecraft. The astronauts got their way because the same NASA publicity that made these men heroes said they were great pilots and everyone knew that pilots fly their ships. So with stick in hand the Mercury seven proceeded to demonstrate to their adoring public, the scornful engineers and their peers, the test pilots, that these seven guys were "the rightful occupants of the top of the pyramid of the right stuff."

Wolfe manages to tell the human story of our first steps into space, capturing the slightly paranoid adventurousness of those days, without putting the astronauts back on the pedestal. The reader is privy to moments of incredible courage—the right stuff in action—and moments of high comedy.

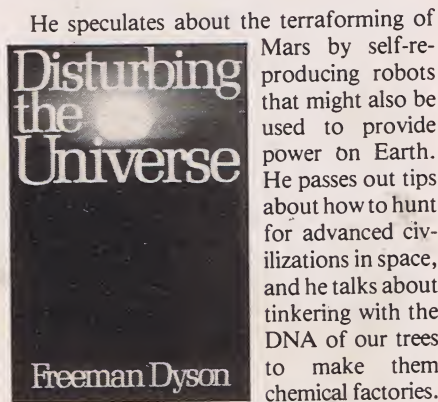
Finally, the beginnings of our greatest technological accomplishment really come alive. *The Right Stuff* is a thoroughly researched, superbly written book that reveals the Mercury astronauts to be ambitious, greedy, argumentative and altogether human, but no less heroes than we thought. It also demonstrates that Tom Wolfe has his share of the right stuff.

Dyson's Universes

In a world increasingly affected by and concerned with science and technology, Freeman Dyson is a scientist obsessed with the future. In *Disturbing the Universe* (\$12.95 in hardcover from Harper & Row) he offers us a chance to look at the problems of the past and the possibilities of the future through the eyes of one of the century's foremost thinkers.

"To understand the nature of science and its interaction with society...one must examine how the individual scientist confronts the real dilemmas of his work," says Dyson. And this scientist has been continuously involved with the most controversial issues faced by modern science from the atomic bomb to the control of genetic engineering. Dyson deftly guides his readers through the complex development of particle physics, the hydrogen bomb, nuclear reactors and the debates about recombinant DNA. You may not come away with an understanding of the technology, but you will know something about the people, and why and how they carried out these projects.

And if getting behind the scenes of some of the science that changed the world isn't enough for you, Dyson looks on into the future. "The future is my distant mirror. I use it to place the problems and difficulties of the present in perspective."



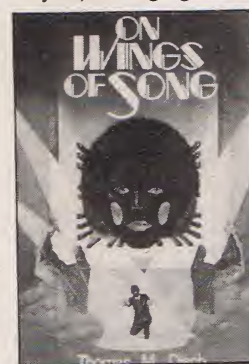
Dyson sees technological change and our new sense of humanity's place in the environment moving together to create a new and unexpected future. Perhaps as we move off the planet, we'll modify humanity to fit what we find instead of being so concerned about transforming the planets into imitation Earths—"A million species will not exhaust the ecological niches that await us."

Dr. Dyson has seen the most frightening aspects of our technology and is still able to be optimistic about our future. That makes this a reassuring book. His quiet, articulate style makes it a pleasure.

A Dischian Future

If Freeman Dyson is an optimist, Thomas Disch is a fabulous pessimist. He's produced some of science fiction's most brilliantly styled bleak vistas in *Camp Concentration* and *334*, and his latest dystopian fable, *On the Wings of Song* (\$10 in hardcover from St. Martin's Press), is a haunting vision of 21st century America that should reestablish Disch as one of the genre's strongest voices.

Disch's hero, Daniel Weinreb, is a 21st century all-American boy, complete with clunky bicycle, average grades and a paper route.



But his world has more lacks than luxuries, and considerably more laws than necessary. In this future, the only possible escape from a multitude of shortages to more pleasant places is flight. With a machine and the right song, people can

fly right out of their bodies as fairies, insubstantial specks of spirit free of all the problems of flesh. But in Amesville, Iowa, Daniel's home town, singing is frowned upon

and flight machinery is outright illegal.

In fact, even the paper Daniel delivers is illegal and his paper route lands him in Spirit Lake, a prison without bars where each prisoner carries a bomb in his belly that detonates if he goes astray. After a chilling interlude in prison, Daniel returns to Amesville and falls in love with the local bigshot's tough-minded daughter. Here should be Daniel's entrance to easy street, but it all falls apart when, on the first day of their honeymoon in New York City, she takes off on a flight without an airplane and doesn't come back.

Daniel can't go home, so he deposits her body in storage and disappears into the spectacular decay of 21st century New York. In this strange land, he learns about love, honor and, most important, song. He emerges from exile on the cover of *Newsweek*, the newest pop sensation with his songs about flight—even though he's never managed to fly. He emerges only to fall, spectacularly.

The fall and rise and fall of Daniel Weinreb shows Disch at his inventive best. The book makes sly comment on the sins of the 20th century as it catalogs those of the 21st. And while the story may sound bleak, the characters are warm, fully-drawn people able to show startling humor in the face of overwhelming difficulties.

Economic SF

J. Neil Schulman doesn't think the next few years are going to be much fun, but he is less worried about nuclear holocaust, meteor menace and invasion from beyond the stars than he is about economic disaster—the subject of *Alongside Night* (\$8.95 in hardcover from Crown).

The scene is New York City in the year 1999. A hotel room costs \$11,500 a night, a taxi ride across town will run you five grand and the best the government can do is promise to keep the mint running day and night

to make sure there's enough money printed for everyone to have some.

Our hero here is Elliot Vreeland, son of Dr. Martin Vreeland, a Nobel Prize-winning economist who's been imprisoned by the government for speaking out against its

economic policies. Elliot searches for a way to free his father and family from their posh Park Avenue apartment and deliver them to the even posher residence of the Revolu-

tionary Agorist Cadre, a libertarian group that believes whatever government you have should make a profit. Of course, Elliot meets a willing young lady and they learn the revolutionary ropes together while falling in love. And, of course, she turns out to be the runaway daughter of the head of the FBI, his father's captor. It's a bizarre Romeo and Juliet twist.

Now, once upon a time SF authors thought that slipping their readers a little something about elementary physics, chemistry or mathematics along with a good adventure story was a painless way to educate. Folks like Heinlein, Asimov, Clarke, *et al* made a good living out of this, but Mr. Schulman doesn't seem to understand. He gives us the adventure but our lesson in libertarian economics is nothing more than a few jingoistic mutterings about government regulation, welfare mothers and the mysteries of inflation. There's plenty of adventure here with good guys, bad guys, exciting car chases and not a little gunplay, but we were promised more.

Interstellar Optimism

If shortage, plague, pestilence and disease aren't your cup of tea, Iain Nicolson has mapped out *The Road to the Stars* (\$2.75 in paperback from Mentor) in a history of space

flight past, present and future.

Beginning with the question "Why bother?" Nicolson proceeds to demonstrate that space is interesting both for what it has to offer in material goods (you might get rich) and for all the interesting folks you may meet out there.

Nicolson has a rare talent for explanation. He manages to whisk the reader through the history and basic physics of rocketry without losing you to the twin traps of boredom or befuddlement. After rocketry come the more exotic possibilities for moving around our solar system—ion propulsion, solar sails, nuclear rockets. Then we get to the fun part, as we leave our system behind.

This optimist doesn't see anything silly about discussing faster-than-light travel as a near future opportunity. He points out that Wilbur and Orville got humanity off the ground only a little more than a half-century before the Russians reached escape velocity, an increase in velocity of more than a thousandfold, and technology doesn't seem to be slowing down. So begins a tour of the puzzles

and paradoxes of FTL—time dilation, mass increase and changes in size—that finishes with a budget for building a starship.

If you can't quite get up to the speed of light, Mr. Nicolson has a host of options including fusion rockets, nuclear pulse rockets like the British Interplanetary Society's *Daedalus*, interstellar ramjets and laser-photon sails—and that doesn't include his esoteric addenda like matter-antimatter drives or photon rockets.

This is a complete guide to getting out into the universe that includes all the rules we know so far and some of our best guesses about breaking the rules (if we can't go faster than light maybe we can cheat by skipping around a spinning black hole) or where we might go to hunt some new rules (through a black hole). And this is only a taste of what Nicolson has in store. For those interested in how to really get away from it all, this is an essential addition to your library. It's also a lot of fun.

Asimov's Disasters

Some disaster scenarios are surrounded by a story, but for those of you who like your bad news straight, Isaac Asimov has prepared *A Choice of Catastrophes* (\$11.95 in hardcover from Simon and Schuster).

This catalog of the worst possible times and places should satisfy all connoisseurs of rainy days and Irwin Allen productions. Dr. A. outlines five classes of catastrophe, starting with those that wipe out the entire universe and working his way down to those that would only destroy civilization as we know it. And he does it very well.

In the clear, concise prose that is the good doctor's trademark, he explains the properties of such complicated threats as black holes, quasars, supernovas and wayward stars; discusses (with remarkable calm) the end of the world in a hail of meteorites or other extraterrestrial debris; then winds down with an examination of the more mundane possibilities of nuclear or biological warfare.

Happily, Asimov reassures his readers by noting that the most imminent dangers are those over which we have the most control—pollution, war, disease—and that the more we know about these possibilities the better our chances are. So, if you want to save the world, read this book.

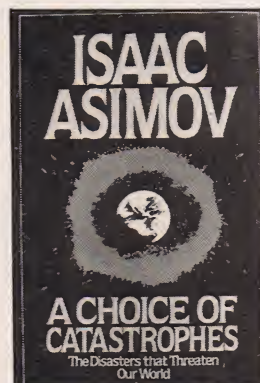
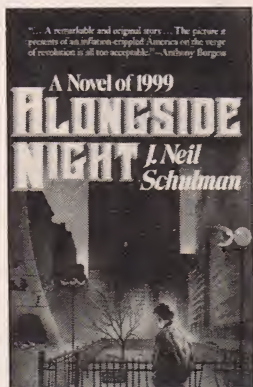
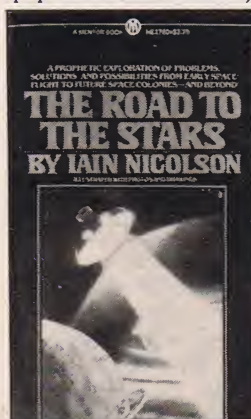




PHOTO: ALEX MACDONALD

By ROBIN SNELSON

When Carl Sagan began work on his PBS series *Cosmos* (coming to television next fall), he naturally called on Jon Lomborg to help visualize his stellar concepts. The scientist and the artist had collaborated before: Lomborg illustrated Sagan's book *The Cosmic Connection*, and he was also an integral part of the team Sagan organized to produce a record of Earth's greatest hits—a two-hour digital record which was affixed to the Voyager spacecraft, intended as a greeting to any extraterrestrial who might intercept the spacecraft in the distant future.

Jon Lomborg's artistic career is shaping up as a two-way interstellar communication: He's sent messages to the cosmos about us, and he communicates to Earthlings the mysteries and beauty of the cosmos.

"Our ultimate destiny—or at least a very attractive ultimate destiny—is for humanity to solve all its own problems, and become an island of highly developed and sophisticated matter that contacts other such islands," says Jon.

The 31-year-old artist is an American who grew up in Philadelphia and now makes his home in Toronto, Canada. For the last year and a half he's been shuttling back and forth between Toronto and Los Angeles, devoting his full energies to his assignment as chief artist for *Cosmos*, the 13-part series which may well be the most visually spectacular science show ever seen on television.

"My part of *Cosmos* is essentially finished," Jon reported recently from Toronto, betraying just a hint of relief. "I worked in the early stages on conceptualizing the series, suggesting various visual ways to show what Carl wanted to discuss at best advantage. I worked with Rick Sternbach on storyboarding and designing most of the sequences, and I was responsible for assembling a team of artists to execute the artwork and build the models.

"The work was very interesting, and I'm certain *Cosmos* will be a fantastic series," he says, adding with a sigh, "but personally I

have to say Hollywood is a pretty disgusting place."

While his creative sensibilities were somewhat battered by Hollywood priorities and ethics, Lomborg counts his *Cosmos* involvement among his most valuable experiences. "For me, one of the most exciting parts of working on *Cosmos* was working in close quarters for an extended period with the other artists—Rick (Sternbach) and Don Davis and Adolf Schaller. I learned something from all of them. What I'm anxious to do now is some large-scale pieces of my own, and spend more time on them than was possible on pieces for *Cosmos*."

Jon draws a distinction between his particular style of space art and what might be termed "traditional" space art. "There's a kind of mainstream of space art, which Chesley Bonestell didn't invent but is probably the best exemplar of," he explains. "Its function is to paint with photographic realism places that we can't take photos of yet—Saturn from the surface of one of its satellites, some other planet close to a double star, things like that—and the idea is to render them as realistically as possible.

"My interest in art is a very different approach," he continues. "I'm more interested in conveying ideas rather than landscapes, and in making interesting juxtapositions which people may not have thought of before."

Jon first put brush to canvas at age 18 and, although he has always had a strong interest in the arts, he has never received any formal training as a painter. His evolution as an artist followed a rather unique route.

"I have always been very interested in science and astronomy," he relates, "then I was very involved in the '60s experience—psychedelic drugs, Eastern mysticism, that whole trip. At the same time, I was also very interested in comic books, Marvel comics, the golden age of Steranko, Kirby, John Busceme and people like that. So all three of those threads came together and I started painting.

"I discovered that what I was interested in, both in terms of art and philosophy, was

depictions of the universe, in the sense of 'what does it all mean?' I found that the mystics had a lot to say about that, but I also rekindled my interest in science. In particular, Sagan and Shklovskii's book *Intelligent Life in the Universe* really blew me away. I started doing pictures, and what I wanted to do was approach the subject matter of science with the attitude of Eastern philosophy."

Jon found some value in his explorations of Eastern philosophies. "I ultimately came to the conclusion that a lot of the content of mysticism was pretty worthless. But I do think the attitude—a very reverential, very awe-full attitude about the universe—is the attitude we should all adopt. It's the attitude of the Romantic poets like Wordsworth or Coleridge or Blake—the idea that you can look at a grain of sand or a leaf from any tree, and it's an emblem of the whole universe. If you want to study the cosmos, you look at a leaf. It's all there . . . the stars, the birth of the universe . . . you look at yourself and it's all there. What I want to do in my paintings is extend that to say, you can look at a galaxy and it's all there, too. It's not so much trying to figure out how it would really look if you're standing on the surface of a planet in a globular cluster, as it is asking what it all means. How does it tie in? How is it a part of the one-ness mystics talk about? That's why, in some of my paintings, the structure has more to do with Eastern art than with science."

One of the clearest examples of his space art philosophy is seen on page 59 in a painting Jon describes as "the cosmos at various scales in one extreme perspective." Pictured are: a carbon atom in the phage of a bacteriophage virus, airborne amongst drifting diatoms blown on a sea breeze; insects, plants and a human on planet Earth; this galaxy and the universe. Extreme perspective, indeed.

"To do the kind of work I want to do, you have to be able to take an idea and run with it," he explains. "It's very hard to do that in collaboration. The work I did for *Cosmos* tended to be less along those lines and more along the lines of more traditional space art.

"There are some sequences in the show



ART © 1975 JON LOMBERG

Above: The cosmos at various scales in one extreme perspective; Jon Lomberg's art searches for connections in the universe. Opposite page: Portrait of the artist in the midst of a three-dimensional galaxy he created for the Ontario Science Center.

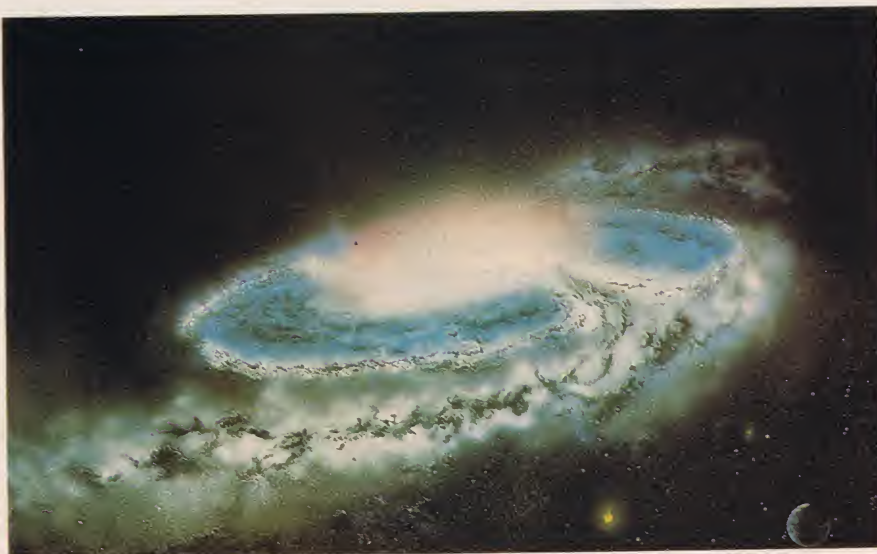


Above: The Earth as a woman lying in the Milky Way, transmitting a DNA message to the cosmos. The artist chose a sexual metaphor to show the ecstatic concept of communication with interstellar life.

Right: A companion painting to the Milky Way woman, showing how the message was actually transmitted—via radio telescope—by astrophysicist Frank Drake.

Left: An inhabited planet can be seen in the lower right hand corner of this painting of a barred spiral galaxy.

Above, right: "Earthfish," an idea that was inspired while driving in the Sinai—"A fish on a reef is analogous to a planet in a galaxy," observes Jon Lomberg.



ART © 1979 JON LOMBERG



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ART © 1979 JON LOMBERG FROM THE COLLECTION OF MR. & MRS. FRANK DRAKE

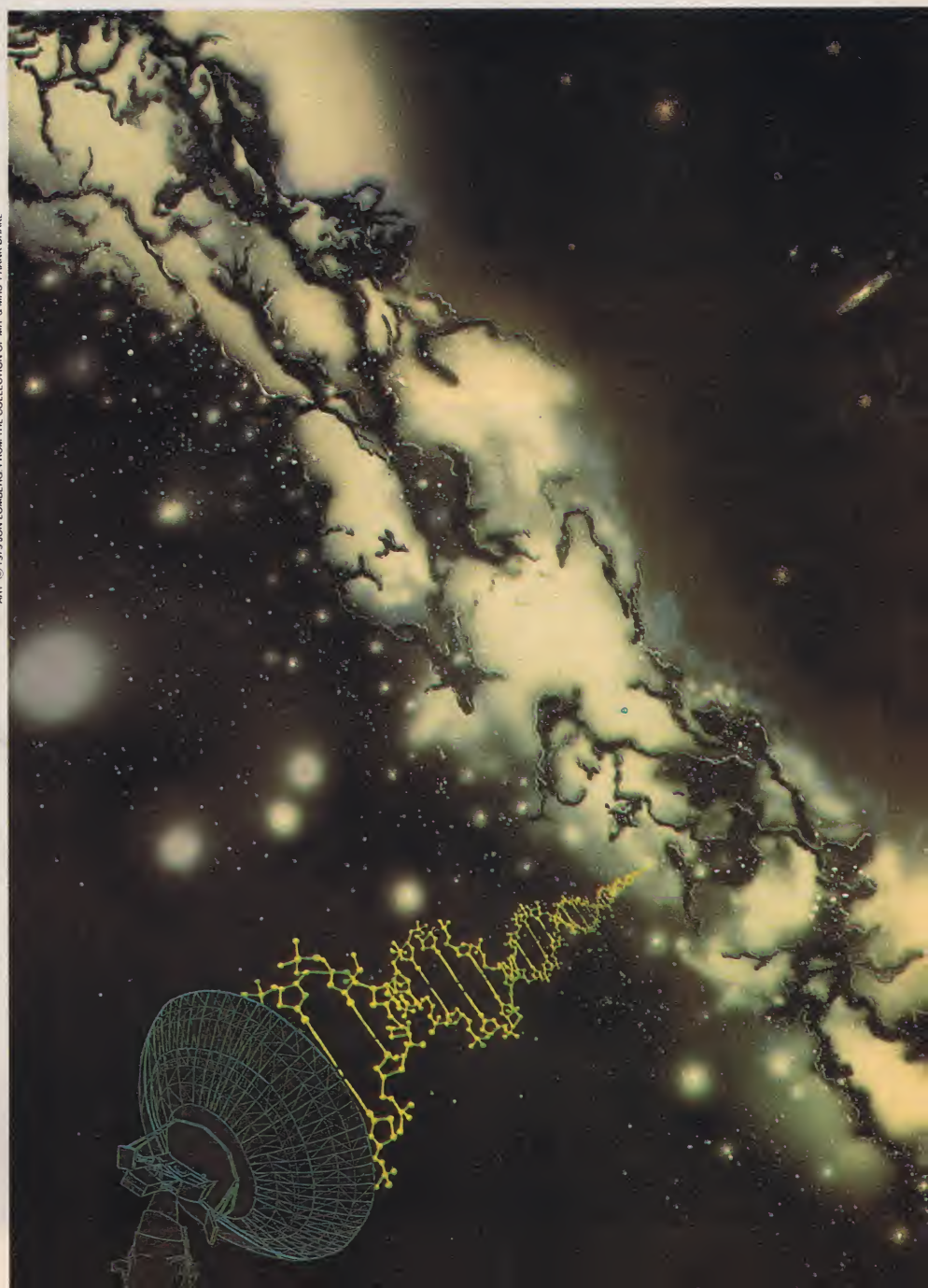


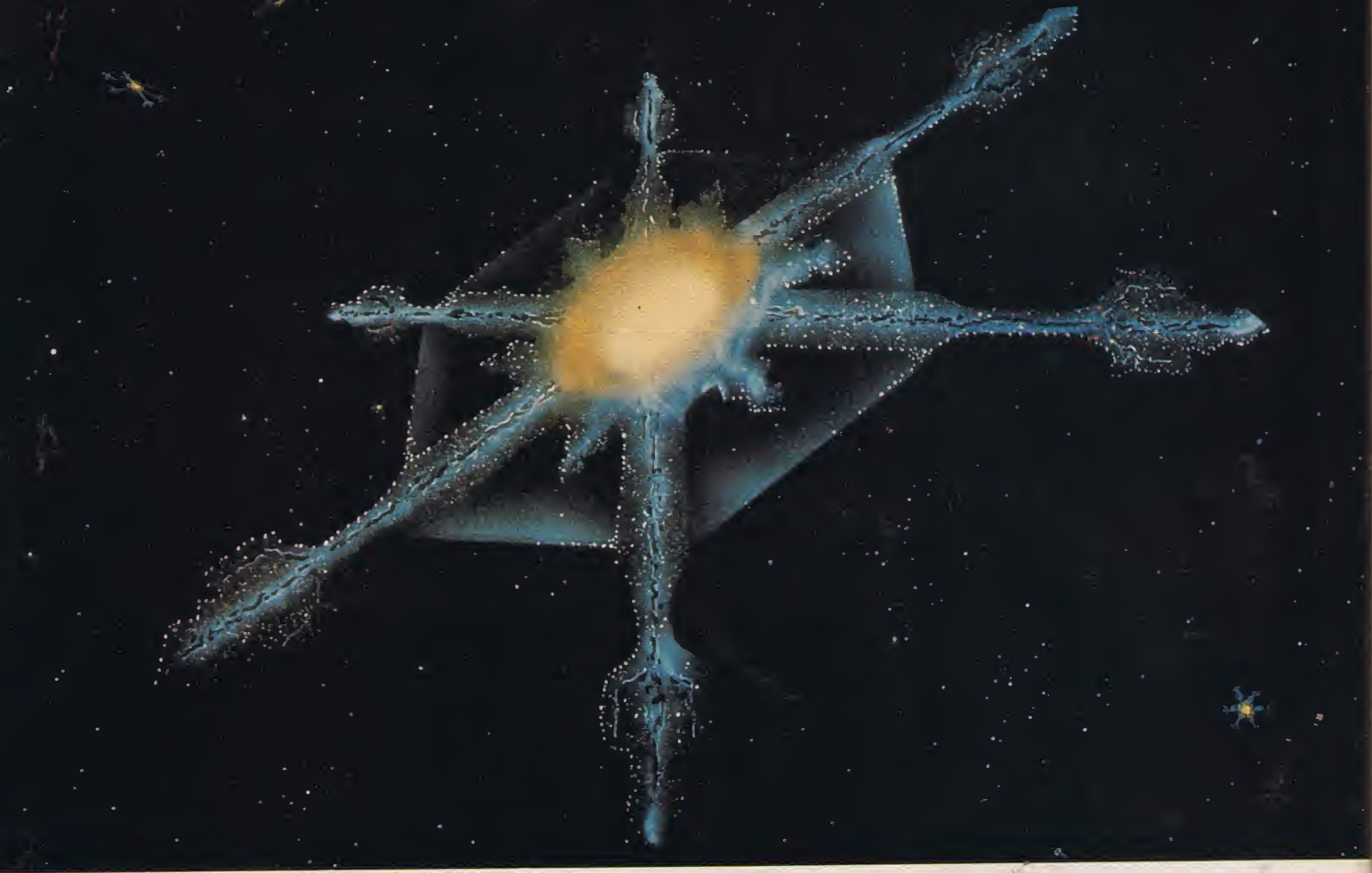
ART © 1979 JON LOMBERG

that I think reflect my own aesthetics and feelings," he adds, "but because *Cosmos* is supposed to reach a very wide audience—who has never even seen *normal* space art, let alone stoned acid space art—they opted for a less metaphorical, more representative approach. So what I'm anxious to do now is take what I've learned in terms of technique and ideas and the very stimulating contact with my fellow artists, and apply that to the work I want to do for myself."

Although he is primarily a painter, Jon also likes to work in various other art forms. He writes, and he likes to play his guitar. He enjoys a wide variety of music, from classical ("particularly baroque, renaissance and Mozart") to Eastern music to folk, rock and electronic sounds. "I don't like disco," he says firmly.

Since 1973 he has created radio shows for the Canadian Broadcasting Company. Not surprisingly, the shows concerned topics like life in the universe, communication with extraterrestrials, spacecraft exploration and





Two paintings done as visual ideas for the PBS television series *Cosmos*, with Carl Sagan, provide a preview of the spacey look of the series. Above: "Snowflake Galaxy" speaks of an intelligent civilization reorganizing its star system to suit its own needs and aesthetics. Below: "Core-Set" is a typically lush Lomborgian galaxy, conveying an awe-full spirit.



ART © 1979 JON LOMBERG KCE/COSMOS

cosmology, along with several live reports during the Viking Mars mission. The shows consisted of music and sound effects montaged with readings of science fiction and poetry, tied together with narrative written by Lomberg. One of the CBC series was titled "Into the Universe." "A pun," he grins. "We are going into the universe, but also we all like to sit back and 'get into' the universe."

Another thing Jon Lomberg gets into is scuba diving. "It's no accident that a lot of 'space people' are avid divers," he says, "because a coral reef is as close as you can come to exploring another world. You're weightless, you're in a life support system, you're surrounded by very alien, incredibly varied and interconnected biologies. It's silent." His underwater experiences formed the inspiration for one of the paintings reproduced here, "Earthfish."

"I was diving in the Sinai, thinking about space and the beauty of life, and somehow it just all came together about how organisms in the ocean are analogous to more highly evolved organisms and planets in space. A fish on a reef is like a planet in a galaxy."

Lomberg's paintings have been exhibited at the Toronto planetarium, and another of his creations is on permanent exhibit at the Ontario Science Center in Toronto: a 12-foot, three-dimensional model of the Milky Way galaxy. "I invented a technique for painting galaxies in three dimensions by painting stars on layers of plexiglass. It's like a tank that you look through and see the galaxy edge-on. There's a button that says 'Where is the sun?' and when you push it a tiny little fiber optic winks at you."

Considering his obvious "cosmic consciousness, it's not hard to understand why Jon Lomberg collaborates with Carl Sagan so often and so well. But how did they link up in the first place?

For Jon, the stimulus came when Sagan devised the Pioneer 10 plaque, the first extraterrestrial calling card attached to a spacecraft headed out of our solar system. "In a way that was as much a message to me as to extraterrestrials," Jon says. He wrote Sagan a long letter and enclosed photographs of some of his paintings. Sagan responded immediately, writing a long letter in return. Then in 1972, Sagan asked Lomberg to meet him at the Toronto airport during a scheduled layover.

"He was only going to be there for a short time," Jon recalls, "and I had never seen a picture of him, and he had never seen a picture of me. So I had to find a way of letting him know who I was." His solution was to make a sign which he taped to his portfolio. The sign consisted of a long equation—the equation used by scientists to calculate the probable number of other technological civilizations in our galaxy.

"Everybody else who looked at the sign just saw gibberish," Jon laughs today, "but finally one dark-haired man came over and shook my hand and said 'Hi Jon.'"

Not long after that meeting Sagan asked Jon to illustrate *The Cosmic Connection*. Their next big project together was the

Voyager record—an ambitious project that might have filled years, but in actuality had to be accomplished in less than two months, in order to meet NASA's launch date. The two-hour, gold-plated disks (one to each Voyager; both now headed toward Saturn) contain music, sounds, pictures and multi-lingual greetings from Earth. They are "bottles in the cosmic ocean," intended as letters of introduction to any extraterrestrial who might, in the distant future, intercept the Voyagers.

Although his main task was assembling the pictorial sequence for the record (encoded digitally, like a videodisc), Jon also made contributions in the areas of musical choices and the sound montage. His participation in the project was based on his long-time interest in using art as a means of communication with extraterrestrials.

"As you know, the reason scientists believe we may be able to communicate with other civilizations is that because, whatever the differences in our biology, we share the same physical universe: one and one is two, a star is hot, that sort of thing. We have something in common that we can use as a means of recognizing each other's intelligence," Jon explains.

"It seems to me that a lot of the principles which underlay human art forms—the order that we see in the curve of a chambered nautilus or in the curve of a spiral galaxy—are aesthetic principles which are universal, so to speak," Jon says. "So if equations are something that both we and extraterrestrials would know about, then fugues and canons and other very highly structured musical forms, or geometric art forms, would also be beautiful to other creatures who have an aesthetic sense.

"The Voyager spacecraft itself tells any recipient a lot about our science," Jon explains. "Any science we know, they'll know already. All we're really telling them is that we're intelligent too. And since we all already know that one and one is two, our art makes a more interesting subject for communications. Because they won't have had Bach—even if they've had composers similarly gifted."

The picture sequence as well as transcripts and descriptions of the Voyager message can be found in a book titled *Murmurs of Earth* (Random House, 1978), co-authored by the team who put the record together.

While Jon Lomberg constructs messages to extraterrestrials, he doesn't have much patience with UFO followers. "One of the things I've learned from Sagan, for which I'm very grateful, is a sense of skepticism and an understanding of what constitutes proof," he says. "That's something that people who are more comfortable with mystical, acidic, visionary kinds of outlooks sadly lack.

"I think there are very strong reasons for assigning a high probability for the existence of intelligent technological life elsewhere in the galaxy and the universe," he continues, "and I enjoy very much imagining what they might be like. Not so much in terms of their physical makeup or even their biochemistry, but more in terms of what they would be in-

The Black Hole

(continued from page 55)

strange film to act in, though, because none of us were shown the last 20 pages of the script. Only three people got to see them."

Director Nelson, who knows how the journey into the black hole during the film's finale is resolved, is mum on the outcome, although the studio publicity department admits that the effects of the black hole could represent "a path to a different part of our universe, or another universe all together, a short-cut around space through an unknown dimension." Or "It is conceivable to enter a black hole and find yourself back where you started before you began."

All that Nelson will say about the finished film is "I hope that audiences get really caught up in the imagination of what we're doing."

As for the Disney studio itself, producer Ron Miller readily admits that, "We're hoping that the film is a phenomenal success. We've tried to envision the unimaginable in this movie and we're hoping that audiences will go to see it for that reason alone. I wouldn't say that we're trying to play down the Disney name with *The Black Hole*, but we're trying to go beyond what people seem to feel it represents today. If we succeed with *The Black Hole*, it will mean a whole new beginning for us. And if we don't succeed... What a great attempt this movie is!"

terested in doing. Because I believe that, like mathematics and art, some of our basic philosophical yearnings may be universal as well."

Because Jon feels the concept of other intelligent life is such an important one, he will not be convinced of it until there's really clear proof. "That is an attitude that I definitely learned from Sagan, and that he shares with every other scientist working on the problem."

As an artist, Jon's work revolves around science's best guesses about the nature of other life forms. "To me, that's so much more exciting than *Star Wars*, so much more interesting than two ships zapping each other in space.

"I'm rather disappointed by a general tendency I see in many science fiction people," says Jon. "For a while I spent a lot of time showing my work and exploring that whole Star Wars, Trekkie subculture because I thought it was a genuine, untapped interest. But they really seem much more interested in imaginary laser weapons. It's the same old violence, cowboy, war movie trip put into space. That's why space is exciting for them, and that just turns me right off. That is really escapist."

Don't look for any ray guns or laser beams in Jon Lomberg's space art; you won't find them. His imagination runs to the culture, science, art and philosophy of other intelligent creatures who live in the universe.

"I can't think of anything less escapist than real contact with the universe."

STARLOG TRADING POST

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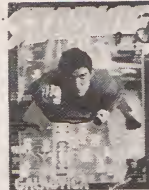
Issue #3 (December) Special-effects issue, combination color landscape and SPACE: 1999 Eagle blueprint poster, SF GRAPHICS catalog.
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No. 3



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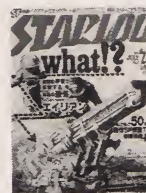
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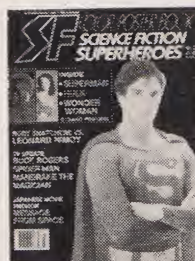
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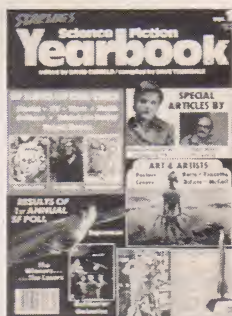
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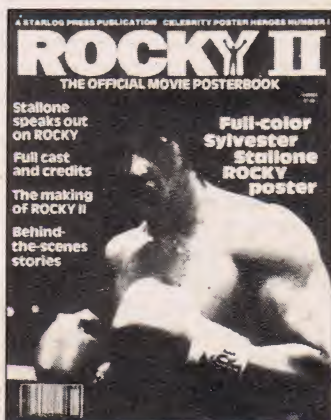


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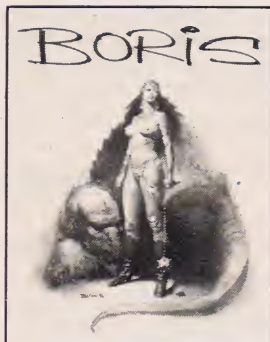
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Star Trek

(continued from page 24)

has either gone to sleep or is legally dead.' He was capable of handling any disaster wonderfully. Something would fall off-camera with a crash during a scene and he'd keep in character and wise-crack about it. Leonard with his incredible straight-face, and Bill with his ad-libs would have made a great comedy team. If they ever release a blooper reel of this movie, it'll look like a Mel Brooks film."

"You just had to resort to humor to break the tension," Kelley adds. "There was one dramatic scene, for instance, that was being shot when we were all really done in. We were on the bridge looking at this titanic object heading for us. We had lines, and these aren't exact quotes, that were all about the object's size. Uhura would say 'Look at the size of that thing.' Someone else would say 'Imagine what it would feel like!' Each progressive line just seemed to get loonier and loonier. We were hysterical within minutes. But," he admits, "there were not as many laughs on this movie as there were on the series. There were a lot of technical difficulties all the time."

* * * * *

One of the biggest problems onboard the new *Enterprise* had to do with the film's special effects...or lack of them. "The special effects problems entered all of our lives," says Collins. "Although, even the effects gave us a few light moments. There is one point where we are all supposed to be looking at this extraordinary vehicle on our bridge screen. We're looking out past the camera at nothing. We didn't even know what sort of special effect would be up there. How could we? The special effects people didn't know what kind of effect would be up there. We're looking at what is going to be this *thing*; spectacular beyond anything known in the 23rd century and what we were really looking at was this grip holding an 'X' mark above the camera so our eyes will travel in the right direction. The grip is up there chewing gum and looking at his watch and we're supposed to be experiencing this epiphany of sight and sound.

"Eventually, we had a sense that the effects weren't going properly. No one actually said anything, but the effects people would wander onto the set during these heavy effects scenes and they wouldn't know what was going on. Now, Bob Wise has the patience of a saint but I could tell that there was an uptight feeling there. When we were working with all this sophisticated technology, Bob and the rest of us were praying that these guys knew what they were doing. After a while, it became clear to us that they didn't."

Indeed, that was just the case. After spending millions of dollars on effects, director Wise, producer Roddenberry and the Paramount front office discovered, much to their horror, that not one piece of effects footage shot was usable. The entire Abel team was fired in one day and Douglas (*Close Encounters*) Trumbull was called in on a seven-day-a-week basis. With only months remain-

ing before release, Trumbull had to shoot an entire film's worth of effects. The prime concern, at that point, was: Will the film make its release date?

"Sure," Wise says, underplaying the situation. "We had problems with effects. I suppose those problems led to some conjecture that we wouldn't make our December release. But the new effects are wonderful. We didn't have to re-shoot any of the live action because of the effects problems. What we re-shot, we would have had to re-shoot anyway."


With Trumbull toiling at effects and the film drawing to a close, security precautions increased on all fronts. During production, eager fans and/or mercantilists had been a constant source of irritation at Paramount; helming search and capture missions in an attempt to filch any memorabilia at hand. A batch of blueprints were stolen (the thief later apprehended) and the top secret script purloined, mimeographed and sold on the Hollywood film black market. "We felt the security threat constantly," Wise shudders. "We literally were worried about the movie getting away from us. People were going through Doug Trumbull's garbage cans looking for discarded film clips. It was a very strange experience in this respect."

After over a year in the making, *Star Trek—The Motion Picture* finally ended production only a month before its release. Needless to say, everyone involved is glad it's over and happy with the results.

"I think that people are going to see a *Star Trek* that they've never seen before," Wise proudly says. "They're going to see a marvelous adventure in space with the whole crew of the *Enterprise* journeying into unknown areas of the universe. For the first time, they're going to see the *Enterprise* in all her glory and magnificence. They're going to see a film that offers a very positive look at space, too. *Star Trek* is not a horror film. It is not a monster film. It's a very positive, affirmative motion picture."

Science advisor Puttkamer agrees wholeheartedly. "The movie is being released at the end of the 1970s. It makes a statement about the future for the benefit of the pop culture that will take us into the 1980s and beyond. Two hundred years from now, historians will look back at the 1960s, 1970s and 1980s and they won't remember the gas lines, assassinations and political squabbles. They are going to look back and point and say 'There. That's when humanity took its first steps into space.' This is a very exciting age to live in. And, since the media, the traditional newspapers and TV reports, aren't pointing out this fact maybe *Star Trek* can do it. Maybe *Star Trek* can move the public to the point where they are aware of the time period they live in and are truly excited by it."

And so, nearly two decades after Gene Roddenberry first envisioned his science fiction statement about "the human condition," the phenomenon of *Star Trek* has finally come of age. "It's everything I wanted it to be," smiles its creator and producer, "...and more."

And, for the record, it wasn't easy. 

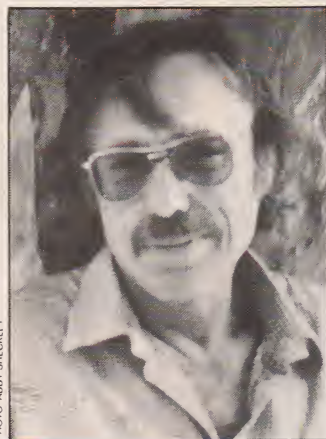


PHOTO: ABBY SHECKLEY

Robert Sheckley's last real job was X-raying engine parts in an aircraft plant. He gave up this career to become a full-time free-lance writer, a move he has only occasionally regretted. His first book of short stories, *Untouched By Human Hands*, appeared in the 1950s and was well-received by his family and friends. Many novels and collections of short stories have followed, some more closely than others. Mr. Sheckley is considered by some to be science-fiction's best known writer never to have received any major awards during his long and crazy writing career. His work is well-known for its creative use of the apostrophe, and he is a pioneer in the rehabilitation of the semi-colon. Among his recent works are *Options*, which has been called "a brilliant exploration of minimalist contingencies," and the recent *Crompton Divided*, which Brian Apollo describes as a

romance of the late Carolingian Empire masquerading as an ontological pastiche. Mr. Sheckley divides his time between New York and limbo. He is presently completing a ten year study on the development and philosophical import of the cobblestone.

The Future of Consciousness

By ROBERT SHECKLEY

In considering the possible future of mankind, we have a choice of many different models. We can extrapolate from one or more of the sciences, or from historical evidence, economic theory, or religious belief. The possibilities are almost unlimited. Where should we begin?

There is one factor which all these models have in common; that is the fact that we construct our questions and find our answers in the hypothesized mental space we call consciousness. Therefore the nature of consciousness is crucial to our inquiry.

The main way in which we differentiate ourselves from all the other species of this planet is in the matter of intelligence. But we also say that dolphins are intelligent, some computers are intelligent, my dog is intelligent. What we are referring to is actually a combination of intelligence and consciousness. Consciousness is the most crucial difference between us and all other species.

Everyone understands what is meant by consciousness, but this doesn't make it easy to define. Consciousness seems to involve self-reflection, and the ability to imagine various outcomes projected from data. To put it more simply, consciousness involves the ability to talk to oneself.

We seem to be the only species around that does that. There are mystical claims that every living thing possesses consciousness, and there are extreme Behaviorist claims that no living thing—including ourselves—possesses it. Perhaps we can agree that consciousness, in the special sense of an "I" who can reflect upon his thoughts, seems unique on Earth to our species.

Consciousness is usually treated as a constant, something which has been around in more or less its present form since homo sa-

piens first stepped onto the stage of history. We know, of course, that there are great differences in the contents of consciousness, but we have tended to believe that the operations of consciousness are universal, qualitatively unchanged since Cro-Magnon times.

But is this true? There is a case to be made for considering consciousness as a still-unfolding development in our evolution rather than an unchanging property of brain mass.

In his recent book, *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (Houghton Mifflin, 1976), Julian Jaynes presents the theory that consciousness is a fairly recent development in mankind, still in a transitional stage, its outcome still unclear. The author covers too much territory for this short article, yet the work is of great interest and possible importance. I will only be able to touch upon Jaynes' main themes here, and I can present none of his proofs. For anyone interested in the subject, I strongly recommend this book. What I intend to do here is to accept Jaynes' hypotheses and extrapolate on the basis of them. (They are not "true," of course; Jaynes himself points out how much work there is to be done in this field. But they can serve as a point of departure into strange new territory—the bicameral mind, the development of consciousness in recent historical times, and the still uncertain path of that development.)

"Bicameral" refers to two houses. In Jaynes' view, mankind once possessed two distinct and mutually exclusive types of mental functioning. Which type prevailed at any one time depended on which side of the brain was in control.

The left brain controls the logical, mathematical and word-processing func-

tions. The operation of this brain could be likened to a digital computer. The right brain houses the intuitive and artistic centers. It could be likened to an analog computer, and it processes by gestalt. Jaynes believes that in early man these two functions were completely compartmentalized. Neither involved consciousness.

Jaynes' bicameral man was robotic, living within a strictly hierarchical world. Everyone obeyed the orders of the person above him without hesitation or doubt. At the top was the king or king-priest. The king obeyed the orders of his god.

As long as there was no doubt or ambiguity, man followed the directions of his left brain computer. But when doubt arose, when there was ambiguity to be resolved, then man consulted his gods. Jaynes locates this god function in the right brain. Early man hallucinated the voices of his gods, and was not conscious that they were hallucinations. He was a robot activated from time to time by a god. Neither robot nor god had consciousness.

Jaynes says, "The world would happen to him and his action would be an inextricable part of that happening with no consciousness whatever. And now let some brand-new situation occur, an accident up ahead, a blocked road, a flat tire, a stalled engine, and behold, our bicameral man would not do what you and I would do, that is, quickly and efficiently swivel our consciousness over to the matter and narratize out what to do. He would have to wait for his bicameral voice which, with the stored-up admonitory wisdom of his life, would tell him nonconsciously what to do."

Man in this condition is what we usually mean by pre-classical man. He lived in an age of certainty. Writers, poets, and mythographers since Hellenistic times and earlier have looked back upon this era as mankind's golden age. Everybody knew what they had to do and nobody suffered any doubts or anxieties; the god took care of everything. Mankind lived in this condition for many thousands of years. The best examples of bicameral civilizations are the Egyptian, Aztec and Incan civilizations.

Jaynes presents many texts from ancient sources to support this view. The earliest texts available to us from Egyptian and Assyrian sources present a picture of complete unity between the ruler and his god. In effect, they are colleagues. The god gives the orders, the king carries them out. There is no hesitation or doubt, no ambiguity.

Doubt begins to creep into the texts after Homeric times. The *Illiad* and *Odyssey* are a kind of watershed between bicamerality and consciousness. The *Illiad* is a bicameral book. Agammemnon and Achilles speak directly to their gods and goddesses. There is no evidence of egoistic self-examination in this book. The *Odyssey* presents a very different picture. Ulysses is a



man of self-reflection and of wiles. Wiliness was impossible to the heroes of the *Illiad*. They had to follow their *moira*, the destiny that bound them to their actions. Ulysses can take precautions against the malice of the gods, Agammemnon cannot. Ulysses is the first modern man, and he is lost.

One of the most salient characteristics of the onset of consciousness is the presence of doubt and uncertainty. During the ages of alien invasions, natural catastrophes, and the migration and intermingling of entire populations, everyone was lost, confused and in search of divine or supernatural guidance. Men mourned their lost gods, as they still do today, and sought means of contacting them through oracles and divination. During this time of confusion, con-

stepping up its function. Not even scientists are immune to the flood of unclassifiable intuitive knowledge. In fact, our leading theoretical physicists, mathematicians and biologists are also our leading mystics. Indeterminacy has entered all of our lives.

We seem to live today in a state of uneasy interaction between the brain lobes. The inadequate logic centers still dominate and we are still searching for our lost gods. The literature of this century shows us what an agonized state consciousness is in, trying to see itself and to portray itself to itself; an "I" trying to see itself.


One of the outcomes of the present status of consciousness is excruciating self-concern, self-reflection brought to an extremity that frequently results in a state of

—are mostly a right brain function. The left brain thinks, the right brain feels. The wound in the psyche of modern man is said to be the split between thought and feeling, and between thought, feeling and action.

Is there some way to heal this split? Is there some way to regain certainty and purpose? Many people are seeking it in one way or another. The current spiritual and religious revival and interest in things occult reflect the hunger for right-hand brain functioning. Drugs, rock music and disco, television and all the forms of media, are attempts to give dominance to right-hand brain functioning. If not this year, then next year, you will no doubt be able to take a workshop course in "Turning On the Dreaming Brain." If you have a friendly doctor, there are many mood enhancing drugs being developed. These presumably will stimulate right brain functioning. And there is biofeedback, rolfing, Alexander technique, and a hundred other therapies and pseudotherapies designed to turn you on, or in Jaynes' view, to turn on the reluctant right-hand brain.

I don't want to discourage anybody, but I strongly suspect that the fun of doing them is mainly what you'll get out of them. If consciousness is a recent and still-unsettled development, I don't think we can speed up integration with our attempts to find manipulative techniques for our psychic situation. Trying to "develop" the dreaming mind might be equivalent to taking a course in how to turn your pineal gland into a functioning third eye. (This may be available in California now.) I don't think we are likely to speed up our evolution. I think we have a full time job just staying up with it.

For the long run, I think that the two lobes of the brain are going to get together to function harmoniously. But at present we are still caught in the confusion of processing new data while simultaneously trying to sort out our meta-values on the still-new equipment that mother nature has issued us. We live today in larger tribes than ever before. Our task of finding ourselves within the world tribe is accordingly difficult. But, if we don't blow ourselves up or pollute ourselves out of existence first, I think the psychic situation will sort itself out.

There is another possibility, however. Maybe nature's experiment in consciousness has been a failure, maybe the invisible decision in the struggle for survival has been made: consciousness is just too confusing, and not really necessary anyhow. Perhaps bicamerality will return, and once again we will live a life without time and without conflict, without anxiety and without pain, without humanness as we know it today. Somewhere, somehow, an evolutionary decision may already have been made. All we can do is wait and see, and meanwhile give the dream world within us as much sustenance as possible. 

"We live today in larger tribes than ever before. Our task of finding ourselves within the world tribe is accordingly difficult. But, if we don't blow ourselves out of existence first, I think the psychic situation will sort itself out. There is another possibility, however. Maybe consciousness is just too confusing and not really necessary anyhow. . . ."

sciousness developed, and ego developed to manipulate consciousness.

Jaynes calls ego the analog "I," since it is a construct rather than an entity. The analog "I" operates in a metaphorical space where it can make a projection of itself, and where it can run through various hypothesized courses of action to determine which might be best at that moment. "Narrativization" is the name Jaynes gives to this process of telling oneself what one might do.

But the gods never spoke again, except to prophets, madmen and poets—people who had never lost the bicameral function. This is essentially the modern situation. The suppression of the dreaming mind in everyday functioning has been increasing since the dark ages. "Rationalism" has tried to take over the god-function. Perhaps the greatest belief in the rational mind was made during the 18th and 19th centuries, when attempts were made by Kant, the French encyclopedists and others to encompass all knowledge within logical systems. The baroque systems put forth by men like Ramon Llull, and many others since Aristotle, are no more than curiosities today. They show us a certain type of mentality rather than the truth they were trying to get at.

In our own 20th century the attempt to unify the various fields of knowledge has been pretty much abandoned. The long suppressed right-hand brain lobe seems to be

more or less complete paralysis. The metaphor for this is "I gotta get my shit together." Most of the people I know, not excluding myself, seem to live in a more or less continual state of confusion. We're always asking, "What's the score?", "What's up?", "What should I do?", "Am I in love?", "Do I hate my parents?" and other questions of this nature which, for most of us, a lifetime is not long enough to resolve.

If consciousness is still in a developmental stage, we may anticipate more changes ahead. In my view, the short-range outlook is for more confusion, more uncertainty, as people try to cope with the ever increasing flood of contradictory signals and data from the outside. The confusion is certain to go on until the next development because the inner processing centers are themselves unstable, continually redefining their positions and jumping between different meta-programs. We don't know what our duty is, or who we should love, or what our relationship is to god, or if there even is a god. The instability of our processing equipment guarantees unreliable conclusions, especially when most of the external data we receive is unreliable. However, now we know the importance of right brain intuitive processing. We also know, or at least strongly suspect, that values and beliefs—the structure upon which we make our decisions

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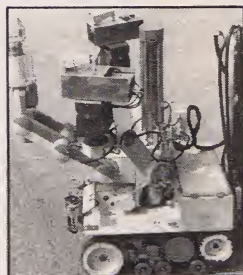
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THE ROBOTS ARE COMING

Robots of the future are usually portrayed as intelligent, humanoid metal men who are either taking over the world or saving it. But, rather than wise-cracking computerized companions, the automatons being manufactured and employed today by industrialists and scientists are neither frightening nor all that intelligent, and they usually resemble random collections of spare parts. FUTURE LIFE introduces today's working robots: Whom do they work for? What do they work at? And how are they working out?



'SATURN 3'—SEXY SPACE OPERA

Shortly before his death, John Barry, who as production designer won an Oscar for Best Art Direction on *Star Wars*, came up with a bizarre idea for a science fiction adventure. In the future, he surmised, it would indeed be possible for a romantic triangle to become a four-sided affair with one of the participants being a robot. Next February, Barry's multi-million-dollar vision, *Saturn 3*, will be released. *Saturn 3* promises to be a real space oddity. Read about the behind-the-scenes action in FUTURE LIFE #17.



THE MAKING OF 'THE BLACK HOLE'

The increasing popularity of science fiction and fantasy films is forcing the technology of filmmaking to leap into the computer age. The computer-controlled camera systems developed for *Star Wars* and *Close Encounters of the Third Kind* are mere wind-up toys when compared to the newest state of the art system developed by Disney's imagineers at W.E.D. and at the studio itself for *The Black Hole*. Next issue, the Disney artists and engineers describe how high technology was used in *The Black Hole* and what's in store for the future of filmmaking.



THE TRUTH ABOUT STELLAR TRAVEL

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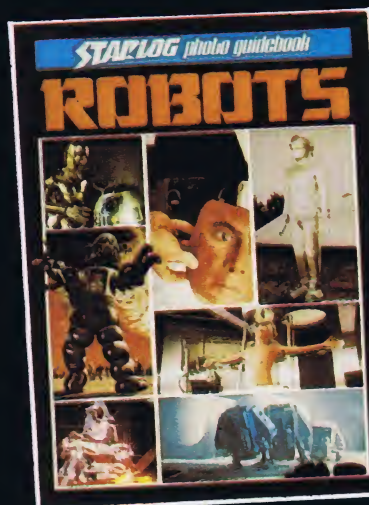
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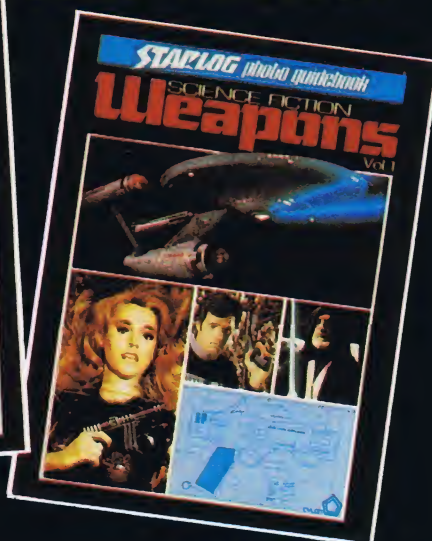
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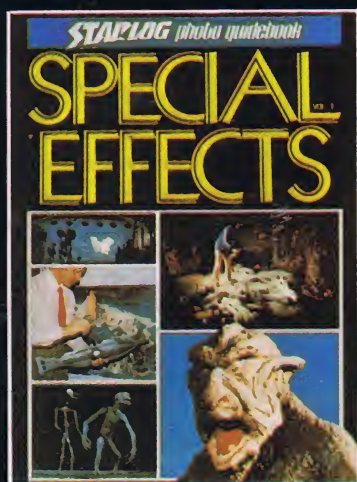
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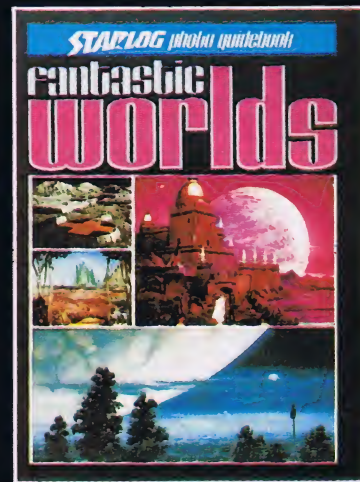
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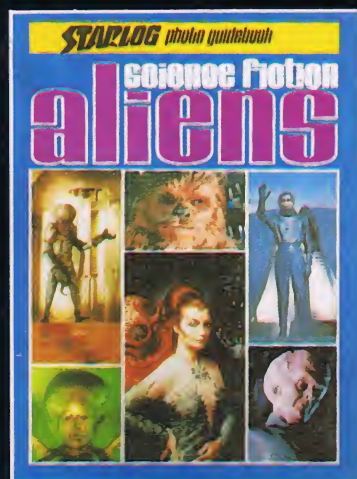
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